DOCUMENT RESUME

ED 412 422 CE 075 003

TITLE	Forestry. Guide to Standards and Implementation. Career & Technology Studies.
INSTITUTION	Alberta Dept. of Education, Edmonton. Curriculum Standards Branch.
ISBN	ISBN-0-7732-5285-1
PUB DATE	1997-00-00
NOTE	479p.
PUB TYPE	Guides - Classroom - Teacher (052)
EDRS PRICE	MF01/PC20 Plus Postage.
DESCRIPTORS	Behavioral Objectives; *Competence; Competency Based Education; Conservation (Environment); Course Content; Curriculum Guides; *Employment Potential; Entry Workers; Foreign Countries; *Forestry; *Forestry Occupations; *Job Skills; Learning Activities; Learning Modules; Secondary Education; Teaching Methods; Technical Education; Vocational Education
IDENTIFIERS	Alberta

ABSTRACT

This Alberta curriculum guide defines competencies that help students build daily living skills, investigate career options in forestry occupations, use technology in the forestry field effectively and efficiently, and prepare for entry into the workplace or related postsecondary programs. The first section provides a program rationale and philosophy for career and technology studies, general learner expectations, program organization information, curriculum and assessment standards, and types of competencies. The second section provides opportunities for students to examine the dynamics of forest ecosystems, as well as the man benefits and opportunities associated with forests. It includes a rationale and philosophy for the financial management strand, strand organization and planning for instruction. The 21 modules are organized into introductory, intermediate, and advanced levels that cover a comprehensive set of competencies in forestry and forest management. Modules also define exit-level competencies, specify prerequisites, and outline specific learner expectations. Other sections of the guide contain the following: module curriculum and assessment standards; assessment tools; linkages and transitions with other strands, other educational programs, and to the community, the workplace and the credentialing process; a learning resource guide listing 76 resources keyed to modules, plus sources for further information; and sample student learning guides. (KC)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED 412 422

CE 075 003

CAREER & TECHNOLOGY STUDIES

FORESTRY

GUIDE TO STANDARDS AND IMPLEMENTATION

1997

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
☑ This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL HAS BEEN GRANTED BY
C Andrews
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

BEST COPY AVAILABLE

Alberta
EDUCATION
Curriculum Standards Branch

ALBERTA EDUCATION CATALOGUING IN PUBLICATION DATA

Alberta. Alberta Education. Curriculum Standards Branch.
Forestry : guide to standards and implementation.

(Career and Technology Studies)
0–7732–5285–1

1. Forests and forestry—Alberta. 2. Forestry schools and education—Alberta. 3. Vocational education—Alberta. I. Title. II. Series: Career and Technology Studies Program.

SD256.A3.A333 1997 634.9

This document was prepared for:

Administrators	✓
Counsellors	✓
General Audience	
Parents	
Students	
Teachers	✓

Program/Level: Career and Technology Studies/Secondary

Copyright ©1997, the Crown in Right of Alberta, as represented by the Minister of Education. Permission is given by the copyright owner for any person to reproduce this publication or any part thereof for educational purposes and on a non-profit basis.

This document supersedes all previous versions of the *Career & Technology Studies Guide to Standards and Implementation.*

This publication is a support document. The advice and direction offered is suggestive except where it duplicates the Program of Studies. The Program of Studies—a prescriptive description of the expectations of student learning, focusing on what students are expected to know and be able to do—is issued under the authority of the Minister of Education pursuant to section 25(1) of the *School Act*, Statutes of Alberta, 1988, Chapter S–3.1 as amended, and is required for implementation. Within this document, the Program of Studies is shaded so that the reader may readily identify all prescriptive statements or segments.

Every effort has been made to acknowledge original sources and comply with copyright regulations. Please notify Alberta Education if there are cases where this has not been done.

Questions or comments about this Guide to Standards and Implementation are welcome and should be directed to:

Career and Technology Studies Unit, Curriculum Standards Branch, Alberta Education, Devonian Building,
11160 Jasper Avenue, Edmonton, Alberta, T5K 0L2.
Telephone: (403) 422–4872, Fax: (403) 422–0576.
Outside of Edmonton dial 310–0000 to be connected toll free.

TABLE OF CONTENTS

Page

Career and Technology Studies

Program Rationale and Philosophy A.1
General Learner Expectations A.3
Program Organization A.3
    Curriculum Structure A.3
    Levels of Achievement A.4
Curriculum and Assessment Standards A.5
Types of Competencies A.5
    Basic Competencies Reference Guide A.6

Forestry

Strand Rationale and Philosophy B.1
Strand Organization B.3
    Development Model B.3
    Levels B.3
    Scope and Sequence B.5
    Module Descriptions B.6

Planning for Instruction

    Planning for CTS C.1
    Planning for Forestry C.2

Module Curriculum and Assessment Standards: Introductory Level D.1

Module Curriculum and Assessment Standards: Intermediate Level E.1

Module Curriculum and Assessment Standards: Advanced Level F.1

Assessment Tools G.1

Linkages/Transitions H.1

Learning Resource Guide I.1

Sample Student Learning Guides J.1

Acknowledgements K.1

CAREER AND TECHNOLOGY STUDIES

A. PROGRAM RATIONALE AND PHILOSOPHY

Through Career and Technology Studies (CTS), secondary education in Alberta is responding to the many challenges of modern society, helping young people develop daily living skills and nurturing a flexible, well-qualified work force.

In Canada's information society, characterized by rapid change in the social and economic environment, students must be confident in their ability to respond to change and successfully meet the challenges they face in their own personal and work lives. In particular, they make decisions about what they will do when they finish high school. Many students will enter the work force, others will continue their education. All students face the challenges of growing independence and responsibility, and of entering post-secondary programs and/or the highly competitive workplace.

Secondary schools also face challenges. They must deliver, on a consistent basis, high quality, cost-effective programs that students, parents and the community find credible and relevant.

CTS helps schools and students meet these challenges. Schools can respond more efficiently and effectively to student and community needs and expectations by taking advantage of the opportunities in the CTS curriculum to design courses and access school, community and distance learning resources. Students can develop the confidence they need as they move into adult roles by assuming increased responsibility for their learning; cultivating their individual talents, interests and abilities; and by defining and acting on their goals.

As an important component of education in Alberta secondary schools, CTS promotes student achievement by setting clear expectations and recognizing student success. Students in CTS develop competencies—the knowledge, skills and attitudes they are expected to demonstrate, that is, what they know and what they are able to do.

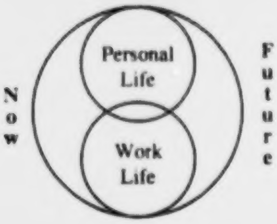
Acquired competencies can be applied now and in the future as students make a smooth transition into adult roles in the family, community, workplace and/or further education. To facilitate this transition, clearly stated expectations and standards have been defined in cooperation with teachers, business and industry representatives and post-secondary educators.

CTS offers all students important learning opportunities. Regardless of the particular area of study chosen, ***students*** in CTS ***will***:

- develop skills that can be applied in their daily lives, now and in the future
- refine career-planning skills
- develop technology-related skills
- enhance employability skills
- apply and reinforce learnings developed in other subject areas.

In CTS, students build skills they can apply in their everyday lives. For example, in the CTS program, particularly at the introductory levels, students have the opportunity to improve their ability to make sound consumer decisions and to appreciate environmental and safety precautions.

CAREERS



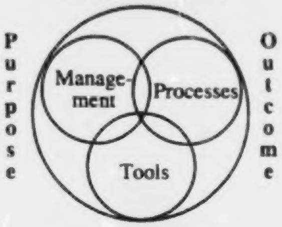
A career encompasses more than activities just related to a person's job or occupation; it involves one's personal life in both local and global contexts; e.g., as a family member, a friend, a community volunteer, a citizen of the world.

The integration of careers throughout the CTS program helps students to make effective career decisions and to target their efforts. CTS students will have the opportunity to expand their knowledge about careers, occupations and job opportunities, as well as the education and/or training requirements involved. Also, students come to recognize the need for lifelong learning.

Students in CTS have the opportunity to use and apply technology and systems effectively and efficiently. This involves:

- a decision regarding which processes and procedures best suit the task at hand
- the appropriate selection and skilled use of the tools and/or resources available
- an assessment of and management of the impact the use of the technology may have on themselves, on others and on the environment.

TECHNOLOGY



Integrated throughout CTS are employability skills, those basic competencies that help students develop their personal management and social skills. Personal management skills are improved as students take increased responsibility for their learning, design innovative solutions to problems and challenges, and manage resources effectively and efficiently. Social skills improve through learning experiences that require students to work effectively with others, demonstrate teamwork and leadership, and maintain high standards in safety and accountability.

As well as honing employability skills, CTS reinforces and enhances learnings developed in core and other complementary courses. The curriculum emphasizes, as appropriate, the effective application of communication and numeracy skills.

In addition to the common outcomes described above, students focusing on a particular area of study will develop career-specific competencies that support entry into the workplace and/or related post-secondary programs. Career-specific competencies can involve understanding and applying appropriate terminology, processes and technologies related to a specific career, occupation or job.

GENERAL LEARNER EXPECTATIONS

General learner expectations describe the basic competencies integrated throughout the CTS program.

Within an applied context relevant to personal goals, aptitudes and abilities; *the student* in CTS *will*:

- demonstrate the basic knowledge, skills and attitudes necessary for achievement and fulfillment in personal life
- develop an action plan that relates personal interests, abilities and aptitudes to career opportunities and requirements
- use technology effectively to link and apply appropriate tools, management and processes to produce a desired outcome
- develop basic competencies (employability skills), by:
  - selecting relevant, goal-related activities, ranking them in order of importance, allocating necessary time, and preparing and following schedules (managing learning)
  - linking theory and practice, using resources, tools, technology and processes responsibly and efficiently (managing resources)
  - applying effective and innovative decision-making and problem-solving strategies in the design, production, marketing and consumption of goods and services (problem solving and innovation)
  - demonstrating appropriate written and verbal skills, such as composition, summarization and presentation (communicating effectively)
  - participating as a team member by working cooperatively with others and contributing to the group with ideas, suggestions and effort (working with others)
  - maintaining high standards of ethics, diligence, attendance and punctuality, following safe procedures consistently, and recognizing and eliminating potential hazards (demonstrating responsibility).

PROGRAM ORGANIZATION

CURRICULUM STRUCTURE

Career and Technology Studies is organized into **strands** and **modules**.

Strands in CTS define competencies that help students:

- build daily living skills
- investigate career options
- use technology (managing, processes, tools) effectively and efficiently
- prepare for entry into the workplace and/or related post-secondary programs.

In general, strands relate to selected industry sectors offering positive occupational opportunities for students. Some occupational opportunities require further education after high school, and some allow direct entry into the workplace. Industry sectors encompass goods-producing industries, such as agriculture, manufacturing and construction; and service-producing industries, such as business, health, finance and insurance.

Modules are the building blocks for each strand. They define what a student is expected to know and be able to do (exit-level *competencies*). Modules also specify prerequisites. Recommendations for module parameters, such as instructional qualifications, facilities and equipment can be found in the guides to implementation.

The competencies a student must demonstrate to achieve success in a module are defined through the *module learner expectations*. Senior high school students who can demonstrate the module learner expectations; i.e., who have the designated competencies, will qualify for one credit toward their high school diploma.

Specific learner expectations provide a more detailed framework for instruction. Within the context of module learner expectations, the specific learner expectations further define the knowledge, skills and attitudes the student should acquire.

The following chart shows the 22 strands that comprise the CTS program and the number of modules available in each strand.

Strand	No. of Modules
1. Agriculture	33
2. Career Transitions	28
3. Communication Technology	33
4. Community Health	31
5. Construction Technologies	46
6. Cosmetology	58
7. Design Studies	31
8. Electro-Technologies	37
9. Energy and Mines	26
10. Enterprise and Innovation	8
11. Fabrication Studies	41
12. Fashion Studies	29
13. Financial Management	14
14. Foods	37
15. Forestry	21
16. Information Processing	48
17. Legal Studies	13
18. Logistics	12
19. Management and Marketing	19
20. Mechanics	54
21. Tourism Studies	24
22. Wildlife	17

LEVELS OF ACHIEVEMENT

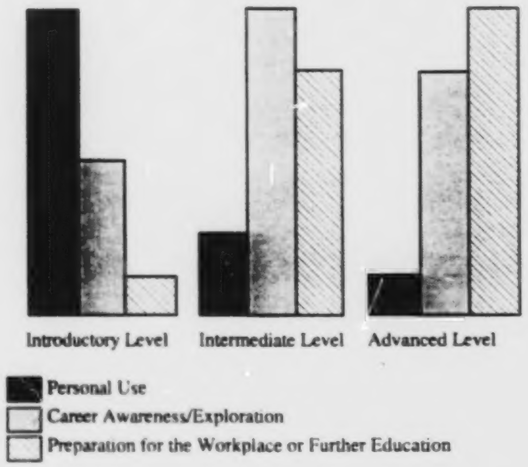
Modules are organized into three levels of achievement: **introductory**, **intermediate** and **advanced**. As students progress through the levels, they will be expected to meet higher standards and demonstrate an increased degree of competence, in both the general learner expectations and the module learner expectations.

Introductory level modules help students build daily living skills and form the basis for further learning. Introductory modules are for students who have no previous experience in the strand.

Intermediate level modules build on the competencies developed at the introductory level. They provide a broader perspective, helping students recognize the wide range of related career opportunities available within the strand.

Advanced level modules refine expertise and help prepare students for entry into the workplace or a related post-secondary program.

The graph below illustrates the relative emphasis on the aspects of career planning at each of the levels.



CURRICULUM AND ASSESSMENT STANDARDS

Curriculum standards in CTS define what students must know and be able to do. Curriculum standards are expressed through general learner expectations for CTS, and through module and specific learner expectations for each strand.

Assessment standards define how student performance is to be judged. In CTS, each assessment standard defines the conditions and criteria to be used for assessing the competencies of each module learner expectation. To receive credit for a module, students must demonstrate competency at the level specified by the conditions and criteria defined for each module learner expectation.

Students throughout the province receive a fair and reliable assessment as they use the standards to guide their efforts, thus ensuring they participate more effectively and successfully in the learning and assessment process. Standards at advanced levels are, as much as possible, linked to workplace and post-secondary entry-level requirements.

TYPES OF COMPETENCIES

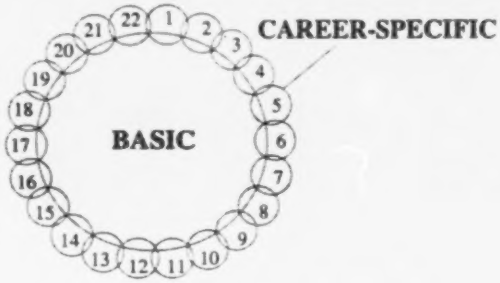
Two types of competencies are defined within the CTS program: basic and career-specific.

Basic competencies are generic to any career area and are developed within each module. Basic competencies include:

- personal management; e.g., managing learning, being innovative, ethics, managing resources
- social; e.g., communication, teamwork, leadership and service, demonstrating responsibility (safety and accountability).

Career-specific competencies relate to a particular strand. These competencies build daily living skills at the introductory levels and support the smooth transition to the workplace and/or post-secondary programs at the intermediate and advanced levels.

The model below shows the relationship of the two types of competencies within the 22 strands of the CTS program.



BASIC COMPETENCIES REFERENCE GUIDE

The chart below outlines basic competencies that students endeavour to develop and enhance in each of the CTS strands and modules. Students' basic competencies should be assessed through observations involving the student, teacher(s), peers and others as they complete the requirements for each module. In general, there is a progression of task complexity and student initiative as outlined in the Developmental Framework*. **As students progress through Stages 1, 2, 3 and 4 of this reference guide, they build on the competencies gained in earlier stages.** Students leaving high school should set themselves a goal of being able to demonstrate Stage 3 performance.

Suggested strategies for classroom use include:

- having students rate themselves and each other
- using in reflective conversation between teacher and student
- highlighting areas of strength
- tracking growth in various CTS strands
- highlighting areas upon which to focus
- maintaining a student portfolio.

Stage 1— *The student:*	**Stage 2**— *The student:*	**Stage 3**— *The student:*	**Stage 4**— *The student:*
Managing Learning			
☐ comes to class prepared for learning	☐ →	☐ →	☐ →
☐ follows basic instructions, as directed	☐ follows instructions, with limited direction	☐ follows detailed instructions on an independent basis	☐ →
	☐ sets goals and establishes steps to achieve them, with direction	☐ sets clear goals and establishes steps to achieve them	☐ demonstrates self-direction in learning, goal setting and goal achievement
☐ acquires specialized knowledge, skills and attitudes	☐ applies specialized knowledge, skills and attitudes in practical situations	☐ transfers and applies specialized knowledge, skills and attitudes in a variety of situations	☐ transfers and applies learning in new situations; demonstrates commitment to lifelong learning
☐ identifies criteria for evaluating choices and making decisions	☐ identifies and applies a range of effective strategies for solving problems and making decisions	☐ uses a range of critical thinking skills to evaluate situations, solve problems and make decisions	☐ thinks critically and acts logically to evaluate situations, solve problems and make decisions
☐ uses a variety of learning strategies	☐ explores and uses a variety of learning strategies, with limited direction	☐ selects and uses effective learning strategies	☐ →
		☐ cooperates with others in the effective use of learning strategies	☐ provides leadership in the effective use of learning strategies
Managing Resources			
☐ adheres to established timelines; uses time/schedules/planners effectively	☐ creates and adheres to timelines, with limited direction; uses time/schedules/planners effectively	☐ creates and adheres to detailed timelines on an independent basis; prioritizes task; uses time/schedules/planners effectively	☐ creates and adheres to detailed timelines; uses time/schedules/planners effectively; prioritizes tasks on a consistent basis
☐ uses information (material and human resources), as directed	☐ accesses and uses a range of relevant information (material and human resources), with limited direction	☐ accesses a range of information (material and human resources), and recognizes when additional resources are required	☐ uses a wide range of information (material and human resources) in order to support and enhance the basic requirement
☐ uses technology (facilities, equipment, supplies), as directed, to perform a task or provide a service	☐ uses technology (facilities, equipment, supplies), as appropriate, to perform a task or provide a service, with minimal assistance and supervision	☐ selects and uses appropriate technology (facilities, equipment, supplies) to perform a task or provide a service on an independent basis	☐ recognizes the monetary and intrinsic value of managing technology (facilities, equipment, supplies)
☐ maintains, stores and/or disposes of equipment and materials, as directed	☐ maintains, stores and/or disposes of equipment and materials, with limited assistance	☐ maintains, stores and/or disposes of equipment and materials on an independent basis	☐ demonstrates effective techniques for managing facilities, equipment and supplies
Problem Solving and Innovation			
☐ participates in problem solving as a process ☐ learns a range of problem-solving skills and approaches	☐ identifies the problem and selects an appropriate problem-solving approach, responding appropriately to specified goals and constraints	☐ thinks critically and acts logically in the context of problem solving	☐ identifies and resolves problems efficiently and effectively
☐ practices problem-solving skills by responding appropriately to a clearly defined problem, specified goals and constraints, by: – generating alternatives – evaluating alternatives – selecting appropriate alternative(s) – taking action	☐ applies problem-solving skills to a directed or a self-directed activity, by: – generating alternatives – evaluating alternatives – selecting appropriate alternative(s) – taking action	☐ transfers problem-solving skills to real-life situations, by generating new possibilities ☐ prepares implementation plans ☐ recognizes risks	☐ identifies and suggests new ideas to get the job done creatively, by: – combining ideas or information in new ways – making connections among seemingly unrelated ideas – seeking out opportunities in an active manner

Stage 1— *The student:*	**Stage 2**— *The student:*	**Stage 3**— *The student:*	**Stage 4**— *The student:*
Communicating Effectively			
☐ uses communication skills; e.g., reading, writing, illustrating, speaking	☐ communicates thoughts, feelings and ideas to justify or challenge a position, using written, oral and/or visual means	☐ prepares and effectively presents accurate, concise, written, visual and/or oral reports providing reasoned arguments	☐ negotiates effectively, by working toward an agreement that may involve exchanging specific resources or resolving divergent interests
☐ uses language in appropriate context	☐ uses technical language appropriately	☐ encourages, persuades, convinces or otherwise motivates individuals	☐ negotiates and works toward a consensus
☐ listens to understand and learn	☐ listens and responds to understand and learn	☐ listens and responds to understand, learn and teach	☐ listens and responds to understand, learn, teach and evaluate
☐ demonstrates positive interpersonal skills in selected contexts	☐ demonstrates positive interpersonal skills in many contexts	☐ demonstrates positive interpersonal skills in most contexts	☐ promotes positive interpersonal skills among others
Working with Others			
☐ fulfills responsibility in a group project	☐ →	☐ seeks a team approach, as appropriate, based on group needs and benefits; e.g., idea potential, variety of strengths, sharing of workload	☐ leads, where appropriate, mobilizing the group for high performance
☐ works collaboratively in structured situations with peer members	☐ cooperates to achieve group results	☐ works in a team or group: – encourages and supports team members – helps others in a positive manner – provides leadership/ followership as required – negotiates and works toward consensus as required	☐ understands and works within the context of the group
☐ acknowledges the opinions and contributions of others in the group	☐ maintains a balance between speaking, listening and responding in group discussions ☐ respects the feelings and views of others		☐ prepares, validates and implements plans that reveal new possibilities
Demonstrating Responsibility			
Attendance			
☐ demonstrates responsibility in attendance, punctuality and task completion	☐ →	☐ →	☐ →
Safety			
☐ follows personal and environmental health and safety procedures	☐ recognizes and follows personal and environmental health and safety procedures	☐ establishes and follows personal and environmental health and safety procedures	☐ transfers and applies personal and environmental health and safety procedures to a variety of environments and situations
☐ identifies immediate hazards and their impact on self, others and the environment	☐ identifies immediate and potential hazards and their impact on self, others and the environment	☐ →	☐ →
☐ follows appropriate/emergency response procedures	☐ →	☐ →	☐ →
			☐ demonstrates accountability for actions taken to address immediate and potential hazards
Ethics			
☐ makes personal judgements about whether or not certain behaviours/actions are right or wrong	☐ assesses how personal judgements affect other peer members and/or family; e.g., home and school	☐ assesses the implications of personal/group actions within the broader community; e.g., workplace	☐ analyzes the implications of personal/group actions within the global context
			☐ states and defends a personal code of ethics as required

★ Developmental Framework			
• *Simple task*	• *Task with limited variables*	• *Task with multiple variables*	• *Complex task*
• *Structured environment*	• *Less structured environment*	• *Flexible environment*	• *Open environment*
• *Directed learning*	• *Limited direction*	• *Self-directed learning, seeking assistance as required*	• *Self-directed/self-motivated*

FORESTRY

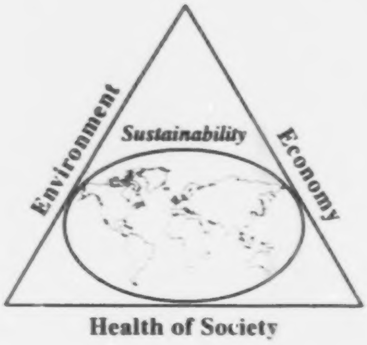
B. STRAND RATIONALE AND PHILOSOPHY

Forests are a source of natural wealth and cover almost two-thirds of Alberta. The resources found on or beneath these public lands contribute to our economy and quality of life. Forested lands in Alberta and Canada provide wildlife habitats, vital watersheds, grazing lands, outdoor recreation and tourism opportunities, and support the development of the forest products industry.

Achieving harmony among the diverse and sometimes competing needs associated with forested lands is an important and continuing task. Through public involvement and a team approach, integrated resource management provides a process for achieving balanced use of forest resources.

Recently, global levels of public concern for forests has expanded to embrace practices that ensure sustainable use of forest ecosystems. Such sustainable use of resources and the environment today will not damage prospects for their continued use by future generations.*

Forestry, a strand in Career and Technology Studies, will provide opportunities for students to examine the dynamics of forest ecosystems, as well as the many benefits and opportunities associated with forests. Conservation is viewed throughout this strand as a process for managing human use of the forest environment to ensure such use is sustainable. Students will develop practical knowledge of industry practices that support the integrated and sustainable development of forest resources.



Students in Forestry will develop the knowledge, skills, attitudes, motivation and commitment to work individually and collectively, as private citizens and members of the work force, toward the conservation and responsible use of water, land, air, forests and wildlife. Within the philosophy of Career and Technology Studies, ***students*** in Forestry *will*:

- develop greater awareness of the economic, environmental and social significance of the forest resource in Alberta and the rest of the world, and the benefits and costs of resource development

---

* Parks Canada and the Canadian Wildlife Service. *The Nature of Canada: A Primer on Spaces and Species.* Ottawa, ON: Environment Canada, 1993.

- describe relationships among production, processing and marketing systems within the forest products industry

- describe technologies and research programs designed to develop, conserve, protect, enhance and sustain the productivity of forested lands

- translate sustainable development and conservation goals into viable plans for managing use of the forest resource

- develop competencies and behaviours that have broad application to environmental career paths, and specific application to careers within Alberta's forest industries.

STRAND ORGANIZATION

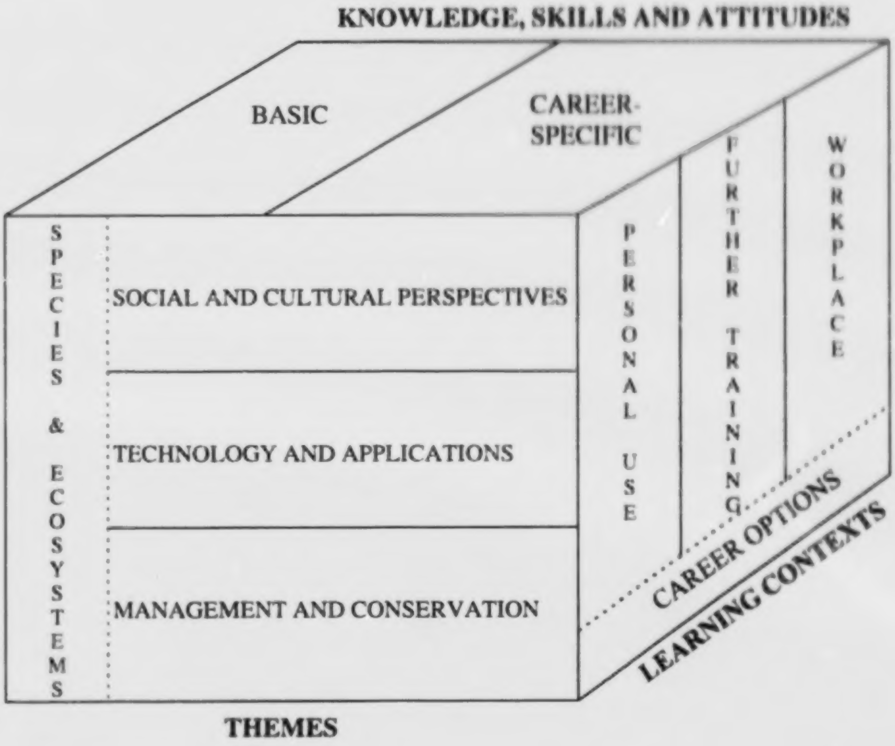
DEVELOPMENT MODEL

The development model depicts three dimensions that provide a basis for selecting and organizing content within the Forestry strand.

- The KNOWLEDGE, SKILLS AND ATTITUDES, represented on the upper face of the model, provide structure for the course and focus attention on learning goals common to all CTS courses.
- The LEARNING CONTEXTS, represented on the right face of the model, foster the development of knowledge and behaviours that will enable students to meet the demands of daily living, further training and the workplace.
- The THEMES provide situational and concrete learning experiences that support the development of knowledge, skills and attitudes relevant to each of the learning contexts. Each theme focuses attention on the sustainable use of species and ecosystems. Blended together, the themes enable students to understand how it is possible to fulfill social, cultural, aesthetic and economic goals through resource development, while embracing a conservation ethic so as to maintain essential ecological process, genetic diversity and an adequate resource base for future generations.

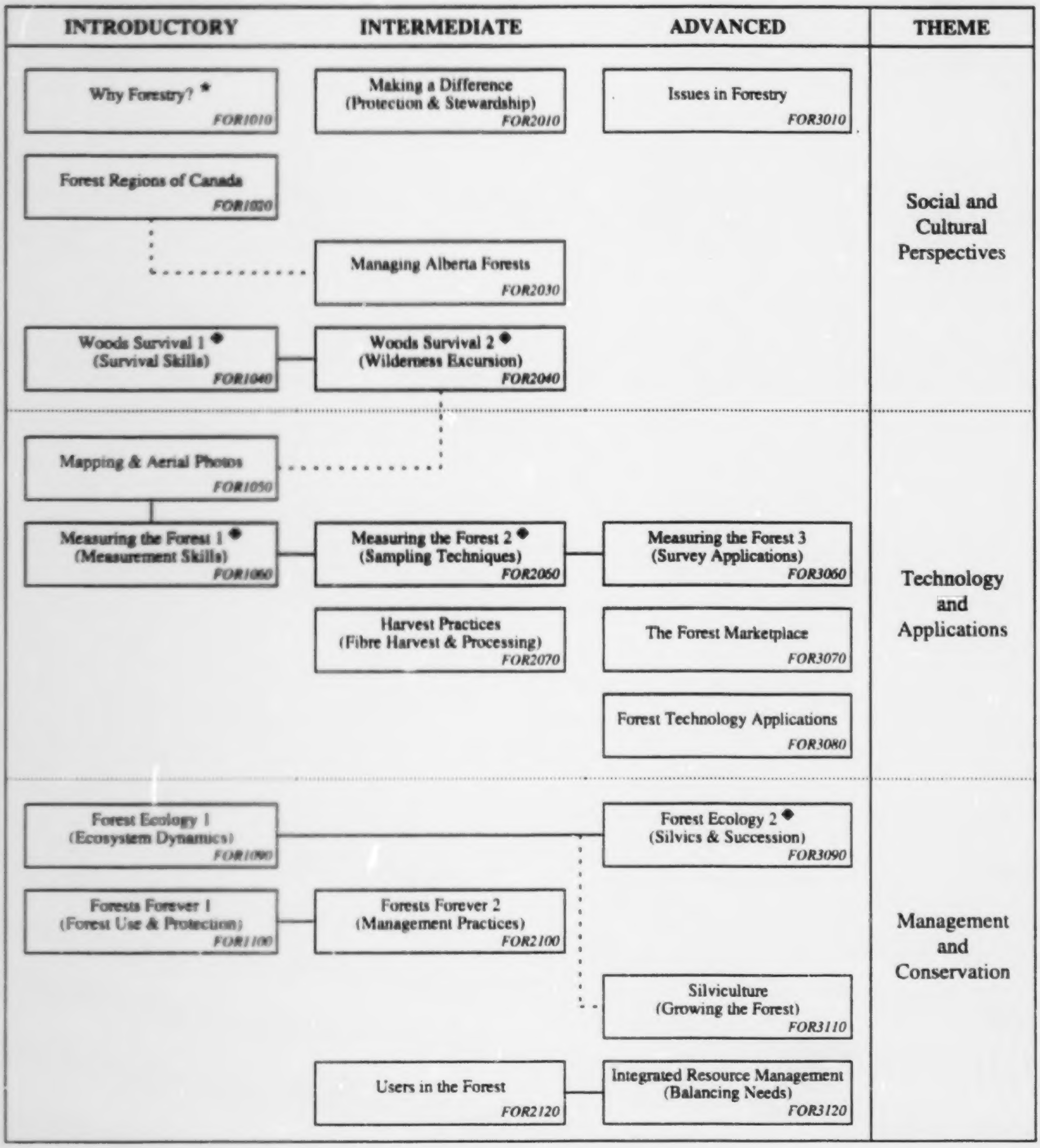
LEVELS

Forestry, like other Career and Technology Studies curricula, is organized into three levels of learning: introductory, intermediate and advanced.


KNOWLEDGE, SKILLS AND ATTITUDES
BASIC
CAREER-SPECIFIC
SPECIES & ECOSYSTEMS
SOCIAL AND CULTURAL PERSPECTIVES
TECHNOLOGY AND APPLICATIONS
MANAGEMENT AND CONSERVATION
PERSONAL USE
FURTHER TRAINING
WORKPLACE
CAREER OPTIONS
LEARNING CONTEXTS
THEMES

Introductory modules enable students to develop basic knowledge of forest regions and ecosystems, and skills necessary for functioning in a forest environment.

Intermediate and advanced level modules develop more specialized knowledge of silviculture practices, and the harvest, processing and marketing of forest products. Students examine forest management policies and programs, and begin to plan for the sustainable development of forested lands.


INTRODUCTORY
INTERMEDIATE
ADVANCED
THEME
Why Forestry? * FOR1010
Making a Difference (Protection & Stewardship) FOR2010
Issues in Forestry FOR3010
Forest Regions of Canada FOR1020
Managing Alberta Forests FOR2030
Woods Survival 1 ◆ (Survival Skills) FOR1040
Woods Survival 2 ◆ (Wilderness Excursion) FOR2040
Social and Cultural Perspectives
Mapping & Aerial Photos FOR1050
Measuring the Forest 1 ◆ (Measurement Skills) FOR1060
Measuring the Forest 2 ◆ (Sampling Techniques) FOR2060
Measuring the Forest 3 (Survey Applications) FOR3060
Harvest Practices (Fibre Harvest & Processing) FOR2070
The Forest Marketplace FOR3070
Forest Technology Applications FOR3080
Technology and Applications
Forest Ecology 1 (Ecosystem Dynamics) FOR1090
Forest Ecology 2 ◆ (Silvics & Succession) FOR3090
Forests Forever 1 (Forest Use & Protection) FOR1100
Forests Forever 2 (Management Practices) FOR2100
Silviculture (Growing the Forest) FOR3110
Users in the Forest FOR2120
Integrated Resource Management (Balancing Needs) FOR3120
Management and Conservation

——— Prerequisite   - - - - Recommended sequence

* Module provides a strong foundation for further learning in this strand.

◆ Refer to specific modules for additional prerequisites.

MODULE DESCRIPTIONS

Module FOR1010: Why Forestry?
Students explain the social, economic and environmental significance of forests, describe the impact of individuals on forests, and identify career opportunities in forestry.

Module FOR1020: Forest Regions of Canada
Students identify factors that determine the distribution of forests, as well as research forest regions of Canada with an emphasis on specific species and forest associations found in Alberta.

Module FOR1040: Woods Survival 1 (Survival Skills)
Students demonstrate basic skills required for responsible participation in a range of outdoor forest activities.

Module FOR1050: Mapping & Aerial Photos
Students interpret information from different types of maps and aerial photographs used in the forestry industry.

Module FOR1060: Measuring the Forest 1 (Measurement Skills)
Students demonstrate basic forest measurement skills, and apply these skills to sample fibre values in a forested region.

Module FOR1090: Forest Ecology 1 (Ecosystem Dynamics)
Students investigate forest ecosystems, and explain the structure and functioning of trees.

Module FOR1100: Forests Forever 1 (Forest Use & Protection)
Students describe past and present uses of Canada's forests, and explain how research and technology assist in forest management.

Module FOR2010: Making a Difference (Protection & Stewardship)
Students analyze the impact of attitudes, actions and lifestyles on forests, and propose individual and shared actions that foster environmental stewardship.

Module FOR2030: Managing Alberta Forests
Students research agencies and structures used to manage forested lands in Alberta.

Module FOR2040: Woods Survival 2 (Wilderness Excursion)
Students plan, prepare for and conduct an extended outdoor wilderness trip in the forest.

Module FOR2060: Measuring the Forest 2 (Sampling Techniques)
Students research current forest inventory practices, and demonstrate appropriate strategies for sampling the fibre and nonfibre value of forests.

Module FOR2070: Harvest Practices (Fibre Harvest & Processing)
Students research the steps involved in harvesting and processing the forest fibre resource.

Module FOR2100: Forests Forever 2 (Management Practices)
Students explain Alberta's forest management goals, and describe the current management practices used to address these goals.

Module FOR2120: Users in the Forest
Students identify different forest users, and explain the planning principles used to develop an integrated resource management plan.

Module FOR3010: Issues in Forestry
Students analyze current local and global issues in forest management, and demonstrate individual and shared actions that foster environmental stewardship.

Module FOR3060: Measuring the Forest 3 (Survey Applications)
Students explain management applications of data collected from a forest survey, and examine the role of technology in current forest inventory practices.

Module FOR3070: The Forest Marketplace
Students describe the range of consumer products and services derived from Canada's forests, and research the production and marketing of these forest products.

Module FOR3080: Forest Technology Applications
Students examine research and technological applications in the forest industry, and examine changing career opportunities in the forestry sector.

Module FOR3090: Forest Ecology 2 (Silvics & Succession)
Students investigate the interrelationships among soil, water, air, trees and the environment, and explain how forests change over time as a result of these interrelationships.

Module FOR3110: Silviculture (Growing the Forest)
Students demonstrate knowledge of the techniques used to establish, grow and harvest tree crops.

Module FOR3120: Integrated Resource Management (Balancing Needs)
Students develop and present an integrated plan for sustainable development of the forest resource.

SECTION C: PLANNING FOR INSTRUCTION

CTS provides increased opportunity for junior and senior high schools to design courses based on the needs and interests of their students and the circumstances within the school and community. Some strands may be appropriately introduced at the junior high school level. Other strands are more appropriately introduced at the senior high school level or to Grade 9 students. Refer to this section for recommendations regarding the Forestry strand, or the *Career & Technology Studies Manual for Administrators, Counsellors and Teachers* for a summary of the recommended grade levels for each strand.

PLANNING FOR CTS

Defining Courses

Schools determine which strands and modules will be offered in a particular school, and will combine modules into courses.

Each module was designed for approximately 25 hours of instruction. However, this time frame is only a guideline to facilitate planning. The CTS curricula are competency based, and the student may take more or less time to gain the designated competencies within each module.

A course will usually consist of modules primarily from the same strand but, where appropriate, may include modules from other CTS strands. Refer to the *Career & Technology Studies Manual for Administrators, Counsellors and Teachers* (Appendix 4) for more information on course names and course codes.

Module selection and sequencing should consider:

- prerequisite(s)
- supporting module(s) (other CTS modules that may enhance the learning opportunity if offered with the module)
- module parameters:
  - instructional qualifications, if specialized
  - equipment and facility requirements, if specialized.

The module parameters are defined for each module in Sections D, E and F of this Guide.

Degree of Flexibility

The CTS program, while designed using the modular structure to facilitate flexible timetabling and instructional delivery, does not mandate the degree of flexibility a school or teacher will offer. The teacher and school will determine the degree of flexibility available to the student. Within the instructional plan established by the school, the student may:

- be given the opportunity to progress at a rate that is personally challenging
- have increased opportunity to select modules that develop competencies he or she finds most relevant.

Integrating Basic Competencies

The basic competencies relate to managing learning and resources, problem solving and innovation, communicating effectively, working with others and demonstrating responsibility are developed throughout the CTS program, and are within each module.

Assessment of student achievement on the basic competencies is integrated throughout the other module learner expectations. Refer to Section G (Assessment Tools) of this Guide for the description of student behaviours expected at each of the four developmental stages defined for the basic competencies.

Assessment of basic competencies could include input and reflection involving the student, teacher(s), peers and others. Description of the observed behaviour could be provided through a competency profile for the module. Positive, ongoing interaction between the student and teacher will support motivation for student growth and improvement.

Assessing Student Achievement

Assessing student competency is a process of gathering information by way of observations of process, product and student interaction.

Where appropriate, assessment tools have been defined to assist the teacher and student in the assessment. Refer to Section G (Assessment Tools) of this Guide for copies of the various tools (worksheets, checklists, sample questions, etc.).

A suggested emphasis for each module learner expectation has also been established. The suggested emphasis provides a guideline to help teachers determine time allocation and/or the appropriate emphasis for each MLE and student grade.

Recognizing Student Achievement

At the high school level, successful demonstration of the exit-level competencies in a module qualifies the student for one credit. Refer to Section A of this Guide for more detailed information about how curriculum and assessment standards are defined in CTS. Refer to the *Career & Technology Studies Manual for Administrators, Counsellors and Teachers* (Appendix 12) for more information on how student achievement can be recognized and reported at the school and provincial levels.

Portfolio

When planning for instruction and assessment, consider a portfolio as an excellent tool to provide evidence of a student's effort, progress and achievement. Portfolios will aid students in identifying skills and interest. They also provide the receiving teacher, employer and/or post-secondary institution proof of a student's accomplishments. The make-up and evaluation of the portfolio should be a collaborative agreement between the student and teacher.

Resources

A comprehensive resource base, including print, software and audio-visual, has been identified to support CTS strands. It is intended that these resources form the basis of a resource centre, encouraging teachers and students to access a wide selection of resources and other information sources throughout the learning process. Unless otherwise noted, these resources are considered to be suitable for both junior and senior high school students.

Authorized resources may be obtained from the Learning Resources Distributing Centre or directly from the publisher or distributor. Refer to Section I (Learning Resource Guide) for the complete resource list including curriculum correlations and resource annotations. Additional sources refer to noncommercial or government agencies that offer resources that may be of assistance in this strand.

Sample Student Learning Guides

In addition to the resources, Sample Student Learning Guides are available (refer to Section J of this Guide). These samples, designed for individual student or small group use, provide an instructional plan for selected modules and include the following components:

- Why take this module?
- What are the entry-level competencies?
- What are the exit-level competencies?
- What resources may be accessed?
- What assignments/activities must be completed?
- What are the timelines?
- How will the final mark be calculated?

Sample Student Learning Guides have been developed for the following modules in Forestry:

- Forest Regions of Canada
- Woods Survival 1
- Forest Ecology 1.

PLANNING FOR FORESTRY

The following suggestions are provided to assist teachers and school and school system administrators as they plan to deliver modules from the Forestry strand.

Selecting Modules

The scope and sequence chart in Section B provides an overview of the Forestry modules, indicating prerequisites and theme areas. Brief descriptions of the modules follow the scope and sequence chart in Section B.

Course planning should take into consideration module sequences that link with both physical and human resources present in the school and community. Although not required, it is recommended that FOR1010: Why Forestry? be a prerequisite/corequisite to all modules in the Forestry strand.

Forestry in Junior High

The introductory level modules may be offered at the junior high level. As each school and community will vary in terms of available resources, it is important to consider potential education partners prior to selecting module sequences.

The number of modules will vary according to time available throughout Grades 7, 8 and 9. Modules may be combined into courses and offered within a school year or over a span of a few years. Junior high students may not complete all the learner expectations in all the modules.

Two sample courses based on introductory level modules are outlined below.

Sample A: 50 hours of instruction

COURSE EMPHASIS
Introduction to Forestry
MODULES
FOR1010 Why Forestry? FOR1020 Forest Regions of Canada
RATIONALE/KEY LEARNINGS
Students examine the economic, environmental and social significance of forests, describe the impact of individuals on forests, and conduct research on forest regions of Canada. The course complements the junior high science and social studies programs, and can be linked with other CTS strands including Tourism and Wildlife.

Sample B: 75 hours of instruction

COURSE EMPHASIS
Personal/Recreational Use of Forests
MODULES
FOR1090 Forest Ecology 1 FOR1040 Woods Survival 1 FOR2010 Making a Difference
RATIONALE/KEY LEARNINGS
Students investigate the structure and functioning of forest ecosystems, develop basic skills required for responsible participation in a range of outdoor forest activities, and propose individual and shared actions that foster environmental stewardship. The course complements the junior high core science program and complementary Environmental and Outdoor Education program, and can be linked with other CTS strands including Tourism and Wildlife.

Where appropriate, junior high school students may also take intermediate level modules, particularly in the Technology and Applications theme.

Forestry in Senior High

All introductory, intermediate and advanced level modules may be offered to senior high students. Three sample courses, based on intermediate and advanced level modules and designed to be delivered to senior high school students, are outlined below.

Sample C: 75 hours of instruction

COURSE EMPHASIS
Forest Inventory (assuming junior high background)
MODULES
FOR2060 Measuring the Forest 2 FOR3060 Measuring the Forest 3 FOR3080 Forest Technology Applications
RATIONALE/KEY LEARNINGS
Students demonstrate appropriate strategies for sampling fibre and non-fibre values of the forest, explain management applications of data collected from a forest survey, and research applications of technology in forest inventory practices. This course can be linked with other CTS strands including Agriculture, Career Transitions, Information Processing, Tourism and Wildlife.

Sample D: 100 hours of instruction

COURSE EMPHASIS
Silviculture and Forest Harvest (assuming junior high background)
MODULES
FOR3090 Forest Ecology 2 FOR3110 Silviculture FOR2070 Harvest Practices FOR3070 The Forest Marketplace
RATIONALE/KEY LEARNINGS
Students investigate relationships among soil, water, air, trees and the environment, demonstrate techniques in establishing, growing, harvesting and processing tree crops, and research the production and marketing of forest products in Canada. The course can be linked with other CTS strands including Career Transitions, Management and Marketing, Mechanics and Wildlife.

Sample E: 125 hours of instruction

COURSE EMPHASIS
Forest Management (assuming junior high background)
MODULES
FOR2030 Managing Alberta Forests FOR2100 Forests Forever 2 FOR2120 Users in the Forest FOR3010 Issues in Forestry FOR3120 Integrated Resource Management
RATIONALE/KEY LEARNINGS
Students research the goals of forest management, and agencies/frameworks used to manage forested lands in Alberta. The module focuses attention on different users in the forest, the planning principles involved in integrated resource management, and individual/shared actions that foster environmental stewardship. This course can be linked with other CTS strands including Agriculture, Career Transitions, Energy and Mines, Legal Studies, Tourism and Wildlife.

Modules could also be grouped into comprehensive courses that develop competencies relevant to career opportunities within a specific industry.

Organizing for Learning

A "learn by doing" approach is recommended for the Forestry strand. Essentially, the teacher's role becomes that of guide and partner in the learning process. The "learn by doing" approach requires the teacher to be facilitator and coach, rather than subject-based expert, as students actively participate in learning by doing and discovering.

Small group instruction is a good way to foster learning by doing and discovering. Small groups enable students to be active participants in learning, and develop independent and responsible learning habits. As students work in small group situations they will share information, solve problems, develop consensus, and help each other learn content and processes.

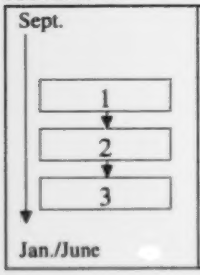
The community has a key role in education and can be an effective partner in the learning process. The use of community members and resources should be integrated into course planning. Business, industry, post-secondary and government agencies offer a wide range of services and resources, as do local clubs, service groups and institutions. When planning for the use of community resources, teachers should ensure that related presentations and/or activities:

- are consistent with student knowledge and skill levels
- demonstrate sound pedagogy
- are exemplary of approved health and safety standards
- provide a balanced approach to curriculum topics and related issues.

- Before selecting modules, teachers should check the module parameters outlined in each module (see Sections D, E and F of this Guide).

Modules can be delivered sequentially, concurrently or combined. For example, although the modules from the Technology and Applications theme are sequential, they can be combined with modules from the Social and Cultural Perspectives theme or the Management and Conservation theme.

Scenario A



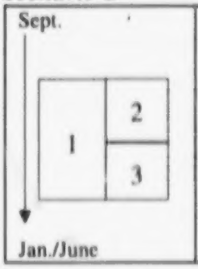
Modules may be taught sequentially, e.g.:

Measuring the Forest 1

↓

Measuring the Forest 2

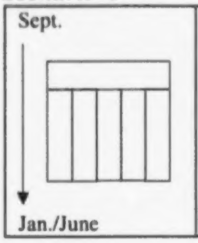
Scenario B



One module, such as Forest Regions of Canada, may be taught throughout the course (e.g., 20 minutes per class) in conjunction with two other modules.

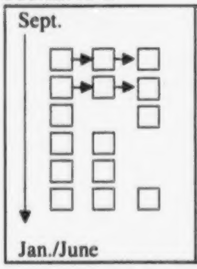
Teachers can also allow students to progress at a rate that is personally challenging; e.g.:

Scenario C



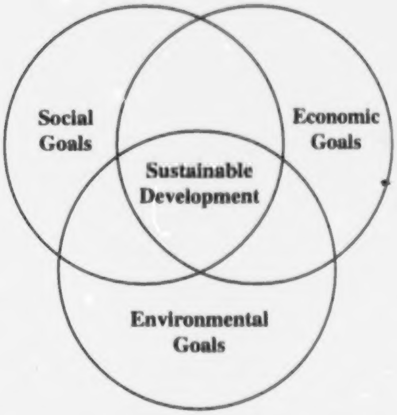
All students take one or two modules together, then are able to select modules from a menu of modules.

Scenario D



From a list of modules defined by the teacher, the students select which ones they will work on and, in consultation with the teacher, establish timelines for completion and submission of assignments, etc.

Plans for learning must address social, environmental and economic perspectives related to sustainable forest management and provide opportunities for students to become involved in learning experiences that reflect a broad understanding of issues related to forest use. Presentations of course content that reflect a singular or narrow view of social, economic or environmental concerns are not consistent with learner expectations and must be avoided.



As in all CTS strands, students will identify, explore and prepare for future career opportunities. It is recommended that course planning include the integration of relevant career investigations throughout each module, rather than as a singular or isolated study. Career profiles, interviews and job shadowing will acquaint students with the many technical and professional careers associated with the forest industry.

Instructional Qualifications

Responsibility for instructional planning and assessment of courses in Forestry will be assumed by Alberta certified teachers. A background in science and/or forest industry will be an asset to those who provide instruction in Forestry modules, particularly at the intermediate and advanced levels. Teachers may find it desirable to access sources of instructional support available from forest industry, professional forestry associations and consultants, and relevant government agencies (e.g., Alberta Environmental Protection).

To ensure compliance with safety and industry standards, some modules require that components of instruction be provided by person(s) having additional credentials granted by industry, government or community organizations. Forestry modules requiring additional instructor qualifications are identified in the following chart.

MODULE	ADDITIONAL INSTRUCTOR QUALIFICATIONS	
	Required	**Recommended**
FOR1040: Woods Survival 1	Standard Level First Aid Certificate	First Aid in the Wilderness Certificate
FOR1060: Measuring the Forest 1	Standard Level First Aid Certificate	
FOR2040: Woods Survival 2	Standard Level First Aid Certificate	First Aid in the Wilderness Certificate
FOR2060: Measuring the Forest 2	Standard Level First Aid Certificate	
FOR3090: Forest Ecology 2	Standard Level First Aid Certificate	

Refer to the corresponding module in Section D, E or F of this Guide for further information regarding each instructor qualification. In some instances it may be desirable to have other qualified individuals in the community work with the teacher to deliver modules (or parts thereof) that require additional instructor qualifications.

Sensitive Issues

Some Forestry modules contain topics of a sensitive nature. Teachers will need to be respectful of family and community values in selecting appropriate modules for courses in Forestry. Modules that reference the consumptive use of forests and examine different methods of forest harvest (i.e., FOR2070, FOR3070) may be sensitive in some communities.

Ethical issues surrounding the sustainable management of forests may also be sensitive for some students (i.e., FOR1100, FOR2100, FOR2120, FOR3010). Emphasis should be placed on a "process" for conflict analysis and not on particular positions that may be expressed.

For further clarification of provincial policy on sensitive issues, refer to Alberta Education's Policy on Controversial Issues (*Alberta Education Policy Manual*, 1996). Teachers and administrators should also review jurisdictional policies related to sensitive issues.

Health, Safety and Related Legislation

Facilities used to support a Forestry program must ensure a safe learning/working environment. Students must be aware of federal, provincial and local regulations governing the tasks they perform, and establish appropriate personal and environmental health and safety procedures in modules that involve:

- the use of specialized hand/power equipment
- the handling and storage of hazardous materials
- outdoor trips and field-based investigation.

Students must understand immediate and potential hazards associated with the tasks they perform, and the possible impact of these hazards on self, others and the environment.

Of particular significance from the perspective of health and safety are modules that involve outdoor trips in forest environments (e.g., FOR1040, FOR2040). These modules require that both student and instructor have prior knowledge of survival techniques and are able to provide first aid in remote locations.

For additional information on health and safety standards, refer to the *Career & Technology Studies Manual for Administrators, Counsellors and Teachers* (Appendix 13).

Addressing Safety in Off-Campus Excursions

Outdoor trips and field-based investigations are recommended and should be an important part of teaching and learning throughout the Forestry strand. Safety must be a prime consideration in planning off-campus learning experiences. Both teachers and students should engage in activities commensurate with their level of training and ability. Adequate instructional support, guidance and supervision must be provided at all times. Local jurisdiction and school policies must be understood by principals, teachers, parents, supervisors and students.

Preparation and Risk Anticipation

The preparation stage is an important part of any off-campus learning experience. At this stage of planning, potential risks can be anticipated and either avoided or moderated. The preparation stage should focus attention on:

- trip administration, including the use of parental permission forms, health information forms, school/system authorization forms and accident report forms as required
- a review of laws and regulations relevant to the learning site and activities that will be undertaken
- assessment of the learning site in terms of potential hazards and risks that may be present
- group size and the level of supervision that will be required (i.e., supervisor/student ratio)
- a briefing of parents, school administrators, government/industry authorities or others who should be informed regarding itineraries, participants and emergency response plans
- pre-trip logistics, including transportation, equipment, facility and departure date/time considerations
- student preparation, including the development of background knowledge/experience and training in specific skill areas.

On-Site Risk Management

Safety and risk management involves exercising situation-specific judgement throughout the course of off-campus learning. Judgement is the product of experience, and may include recognizing factors such as dangers imposed by equipment or animals, deteriorating weather, a decline in physical strength, or a more challenging task. Many of the hazard recognition skills can be taught in the classroom in the preparation stage.

A significant aspect of on-site risk management is group management. Teachers can exercise appropriate group management strategies by focusing attention on:

- pacing, including speed of travel, rest stops, distance travelled and fitness level of students

- maintaining a safe distance for observations
- group control, including position of leader, signal systems and buddy systems
- the establishment of group rules and norms
- clearly defined task allocations for each student
- objective hazard recognition in the field, including machinery and equipment, weather, terrain, flora and fauna
- subjective hazard recognition in the field, including level of group energy and level of cooperation.

Emergency Response

If students have been well prepared for field-based learning experiences and appropriate group management strategies exercised, the teacher will have maximized opportunities for effective response to an emergency situation. An effective emergency response action plan should include consideration of:

- a suitable approach to the accident site
- first-aid supplies and techniques
- a strategy for signalling assistance
- an evacuation plan
- group management throughout the emergency situation.

Identifying Linkages

Section H of this Guide describes linkages within CTS and with core and complementary programs.

In particular, teachers should be aware of the linkages of Forestry with biology components in the junior and senior high science program, and also with environmental components in the junior high Environmental and Outdoor Education Program. The Forestry strand is designed to reinforce, extend and apply related learnings in these courses. Collaborative planning at the school level will ensure meaningful learning experiences through effective integration of these courses.

The Career Transitions strand of CTS provides project, practicum, safety and leadership modules that may be combined with modules in Forestry to increase opportunity for students to develop expertise, refine their competencies and/or obtain credentials.

Using "Project" Modules

Students may use one or more of the 10 project modules to expand learning beyond the competencies outlined in particular Forestry modules. For example, a silviculture or forest inventory project may require more than the 25, 50 or 75 hours available through modules by that name. In these instances, project modules from the Career Transitions strand may be accessed so as to provide sufficient time for completion of learning and the task. For each project module, the teacher and student establish specific learning outcomes, assessment criteria, resources and timelines.

Using "Practicum" Modules

Students may use one or more of the four practicum modules to extend the competencies developed in particular Forestry module(s) in order to attain a recognized credential offered by an agency external to the school. For example, students who plan to work in the forest industry may wish to access a practicum module from the Career Transitions strand in order to obtain a "Bear Awareness and Avoidance" certificate. Practicum modules must be supervised by both a qualified teacher and an experienced professional authorized to supervise trainees for the credential.

Project and practicum modules are **not** designed to be offered as distinct courses and should **not** be used to extend Work Experience 15, 25 and 35 courses.

Improving Smooth Transitions to the Workplace and/or Post-secondary Programs

Refer to Section H of this Guide for potential transitions students may make into:

- the workplace
- related post-secondary programs or other avenues for further learning.

MODULE CURRICULUM AND ASSESSMENT STANDARDS:

SECTION D: INTRODUCTORY LEVEL

The following pages define the curriculum and assessment standards for the introductory level of Forestry.

Introductory level modules help students build daily living skills and form the basis for further learning. Introductory modules are developed for students who have no previous experience in the strand.

Module learner expectations define the competencies a student must demonstrate to achieve success in a module. Assessment standards define the criteria and conditions to be used for assessing the competencies defined in the module learner expectations.

Specific learner expectations provide a detailed framework for instruction to help students build the competencies defined in the module learner expectations. Additional information and suggestions for instruction are provided in the Notes column; teachers may wish to use this space to record their ideas for instruction or student projects.

Module FOR1010: Why Forestry? D.3
Module FOR1020: Forest Regions of Canada D.7
Module FOR1040: Woods Survival 1 (Survival Skills) D.11
Module FOR1050: Mapping & Aerial Photos D.17
Module FOR1060: Measuring the Forest 1 (Measurement Skills) D.23
Module FOR1090: Forest Ecology 1 (Ecosystem Dynamics) D.27
Module FOR1100: Forests Forever 1 (Forest Use & Protection) D.31

MODULE FOR1010: WHY FORESTRY?

Level: Introductory

Theme: Social and Cultural Perspectives

Prerequisite: None

Module Description: Students explain the social, economic and environmental significance of forests, describe the impact of individuals on forests, and identify career opportunities in forestry.

Module Parameters: Access to relevant government, industry and community resources.

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will: • describe the social, economic and environmental significance of forests	*Assessment of student achievement should be based on:* • identifying and explaining six or more ways in which local forests (regional or provincial) have: – social and cultural significance (e.g., recreational, spiritual, aesthetic, medicinal) – economic significance (e.g., employment, product export, tourism, subsistence, tax base) – environmental significance (e.g., air, water and soil cycles). *Assessment Tool* *Knowledge/Application Assessment: Significance of Forests, FOR1010–1* *Sample Timeline: Forestry in North America, FOR1010–2* *Standard* *Respond to a standard of 1 on the rating scale* • a comprehensive list of forest products and services. *Standard* *Identify and describe 20 products and 10 services derived from Canadian forests*	40

MODULE FOR1010: WHY FORESTRY? (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• **explain how personal needs, wants, beliefs and actions may influence the forest resource**	• completing a research project that examines influences of personal needs, wants, beliefs and actions on the forest resource. Research to address the influences of: – consumer choices – recreational patterns – product marketing and promotion – environmentally friendly products – conservation and preservation ethics. *Assessment Tool* *Research Process: Impacts on the Forest Resource, FOR1010–3* *Standard* *Complete all components of research to a standard of 1 on the rating scale*	30
	• maintaining a log/journal of reflections and thoughts regarding the impact of personal attitudes, actions and lifestyle on the forest resource, and ideas for environmental citizenship. *Assessment Tool* *Reflection Guide for Environmental Responsibility/Citizenship, FORREF–ENV* *Standard* *Complete five journal/log entries; address criteria for reflection to a standard of 1 on the rating scale*	
• **identify career opportunities relevant to forestry**	• given current information on career opportunities in forestry, completing a research project on one or more occupations in the forestry sector. *Assessment Tool* *Career Search: Introductory Level, FORCAR–1* *Standard* *Conduct research to a standard of 1 on the rating scale*	30
• **demonstrate basic competencies.**	• observations of individual effort and interpersonal interaction during the learning process. *Assessment Tool* *Basic Competencies Reference Guide and any assessment tools noted above*	Integrated throughout

MODULE FOR1010: WHY FORESTRY? (continued)

Concept	Specific Learner Expectations	Notes
	The student should:	
Forest Role	• present a historical perspective on the social and cultural significance of forests; e.g.: – recreational – spiritual/aesthetic – medicinal – community dependence	Interview people for whom the forest has historical significance (e.g., senior citizens, aboriginal groups).
	• describe the economic significance of forests at local, national and global levels; e.g.: – direct and indirect employment – forest products and export values – tourism – subsistence – tax base	Monitor the performance of forest industry in the stock market. Interview local industry representatives. Visit a local sawmill.
	• describe the environmental significance of forests at local, national and global levels; e.g.: – wildlife and fisheries habitat – watershed protection and maintenance – water, air and soil quality – maintenance of ecosystems – climate change.	Contact the Canadian Forestry Service (Natural Resources Canada) for current resource materials (see Section I: Learning Resource Guide). See *Alberta's Focus on Forests* (Activity 4.2–Products From Canadian Forests).
Personal Impact	• describe the impact of individual attitudes, actions and lifestyle on the forest resource; e.g.: – conservation ethic – preservation ethic – consumer practices – recreational patterns	Conduct interviews with foresters, ranchers, environmentalists, etc. Summarize their views regarding conservation, preservation and sustainable management of forests. Prepare an inventory of household materials used each day. How many of these materials are derived from the forest resource?
	• describe how consumer and marketing trends in society may affect the forest resource; e.g.: – needs versus wants – media exaggeration – use of environmental friendly products	Distinguish between wants and needs. Analyze the impact of television advertisements.

MODULE FOR1010: WHY FORESTRY? (continued)

Concept	Specific Learner Expectations	Notes
Personal Impact (continued)	*The student should:* • propose personal strategies for using forests wisely that foster the attainment of social, cultural, economic and environmental goals; e.g.: – personal actions – leadership roles.	Analyze and debate a controversial issue. Contact the Environmental Law Centre for resources that support issue analysis and conflict resolution. Plan and implement a paper recycling project at home and/or school.
Career Opportunities	• research potential careers and the range of occupational opportunities within the forestry sector: – professional – technical – labour-based	Interview people employed in the forestry sector. Identify general areas of specialization; e.g.: • resource inventory • biology/ecology • resource protection • resource harvest • forest products • environmental management • recreation • education.
	• describe employment statistics within one or more areas of specialization; e.g., – types of careers – number of workers – employment trends	Review National Occupational Profiles (NOC).
	• infer career opportunities and trends from employment statistics	Contact the "Career Hotline" (telephone 1-800-661-3753).
	• infer impacts of the marketplace on employment opportunities	
	• predict possible forest industries in the future, and resulting career opportunities.	Contact senior management people in the forest industry; also producers of value-added products.

MODULE FOR1020: FOREST REGIONS OF CANADA

Level: Introductory

Theme: Social and Cultural Perspectives

Prerequisite: None

Module Description: Students identify factors that determine the distribution of forests, as well as research forest regions of Canada with an emphasis on specific species and forest associations found in Alberta.

Module Parameters: Access to relevant government and library resources.

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student assessment will be based on:*	
• identify factors that determine the type and distribution of forests	• conducting laboratory and/or field investigations to determine the effect of temperature, moisture or soil on plant growth. *Assessment Tool* *Lab Investigations: Factors Affecting Plant Growth, FOR1020–1* *Standard* *Complete lab and/or field investigations to a standard of 1 on the rating scale*	20
	• explaining ways in which climate and land form affect the growth and distribution of forests. *Assessment Tool* *Knowledge/Application Assessment: Growth and Distribution of Forests, FOR1020–2* *Standard* *Respond to a standard of 1 on the rating scale*	10
• locate and describe the forest regions of Canada	• given outline maps of Canada and Alberta, locating and describing: – the eight forest regions of Canada and major tree species within each region – the three forest regions present in Alberta and major tree species within each region. *Assessment Tool* *Task Checklist for Mapping, FORMAP* *Standard* *Complete applicable mapping tasks to a standard of 1 on the rating scale*	30

MODULE FOR1020: FOREST REGIONS OF CANADA (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student assessment will be based on:*	
• identify and describe trees that grow in specific regions of Canada and Alberta	• given access to actual (or photographed) tree, shrub and/or plant species within a forest region of Canada, preparing (following museum conservation rules) a leaf or twig collection including at least 20 native species. Each species to be identified using common and scientific names. (At least 50% of the species identified and collected to be trees. If photographs are used in place of actual specimens, collection to include both closeup and full-view photos of each species.) *Assessment Tool* *Museum Conservation Rules for Leaf/Twig Collection, FOR1020–3* *Standard* *Prepare each specimen in the collection to a standard of 2 on the rating scale*	40
• demonstrate basic competencies.	• observations of individual effort and interpersonal interaction during the learning process. *Assessment Tool* *Basic Competencies Reference Guide and any assessment tools noted above.*	Integrated throughout

Concept	Specific Learner Expectations	Notes
	The student should:	
Determining Factors	• identify factors that enhance the development of forests and determine the distribution of living organisms within forest regions; e.g.: – land form – climate	Consider concurrent delivery of this module with FOR1090: Forest Ecology 1.
	• describe relationships between climatic factors and the growth of trees; e.g.: – temperature – moisture	Conduct a laboratory investigation that examines the effects of moisture on tree growth.

MODULE FOR1020: FOREST REGIONS OF CANADA (continued)

Concept	Specific Learner Expectations	Notes
Determining Factors (continued)	*The student should:* • describe relationships between land forms and the distribution of forests; e.g.: – topography – soil conditions • identify reasons for the distribution of trees in natural regions in Canada and Alberta.	Identify concentrations of particular tree species on a map of a local area. Suggest reasons for the distributions noted.
Forest Regions	• locate and describe the eight forest regions of Canada; e.g.: – Boreal – Subalpine – Montane – Coast – Columbia – Deciduous – Great Lakes/St. Lawrence – Acadian • read, interpret and create visual representations of species distribution in Canada and Alberta.	See *Alberta's Focus on Forests* (Activity 4.1– Trees of Alberta and Canada). Obtain the *Forest Regions of Canada* poster series (Canadian Forestry Service) and the *Natural Regions of Alberta* poster series (Alberta Environmental Protection). Match common trees with their respective locations. Discuss Alberta's six natural regions. Provide relevant mapping exercises.
Tree Identification	• identify common trees and other plants that grow in specific regions of Canada and Alberta; e.g.: – tree and shrub identification – non-woody plant identification • prepare a display of details that help to identify local trees, shrubs and non-woody plants; e.g.: – leaves – flowers/cones – twigs – bark.	Field trips will provide opportunities for "on-site" tree location/ identification. Use appropriate identification keys to assist in identifying tree species. Gather and prepare leaf and twig collections.

MODULE FOR1040: WOODS SURVIVAL 1 (SURVIVAL SKILLS)

Level: Introductory

Theme: Social and Cultural Perspectives

Prerequisite: Emergency First Aid (current certification)

Module Description: Students demonstrate basic skills required for responsible participation in a range of outdoor forest activities.

Module Parameters: Access to an outdoor forest environment and gear for outdoor expeditions. Instructor training (current certification) in Standard Level First Aid is required; instructor training in First Aid in the Wilderness is recommended.

Teachers may wish to access the services of a qualified Outdoor Guide in delivering components of this module.

Off-campus learning activities must be commensurate with previous levels of wilderness training and experience; day trips should precede extended overnight trips; experience in hardcover camping should precede potential softcover camping and/or emergency shelter camping opportunities.

See Section C (Planning for Instruction) and Section H (Linkages/Transitions) for further information on instructor training and certification.

Supporting Module: CTR1210 Personal Safety (Management) [Career Transitions Strand]

Because of the practical nature of this module, students must have a general knowledge of basic first-aid and survival techniques relevant to wilderness environments. See Planning for Instruction in Section C for further information on student safety.

Note: FOR1040 and FOR2040 (Woods Survival 1 and 2) provide opportunities for interaction with a forest environment at a personal level. This module sequence should place emphasis on developing skills that will permit safe travel and outdoor experiences within one or more of Alberta's forest environments.

MODULE FOR1040: WOODS SURVIVAL 1 (SURVIVAL SKILLS) (continued)

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will: • demonstrate knowledge, skills and attitudes necessary for safe and comfortable outdoor forest experiences	*Assessment of student achievement should be based on:* • identifying five or more physical hazards that may be imposed by a forest environment, and explaining appropriate steps to take in avoiding/preventing and responding/dealing with each hazard. *Assessment Tool* *Knowledge/Application Assessment: Hazards in the Forest Environment, FOR1040–1* *Standard* *Respond to a standard of 2 on the rating scale* • a teacher-prepared assessment in which the student demonstrates knowledge of strategies for dealing with hypothermia, frostbite, fatigue, dehydration and fear in the outdoors. *Assessment Tool* *Sample Assessment Items: Woods Survival 1, FOR1040–2* *Standard* *Response indicating 80% mastery* • planning and assembling gear for a three-day trip in the outdoors. *Assessment Tool* *Task Checklist: Woods Survival 1, FOR1040–3* *Standard* *Achieve a performance rating of 2 in applicable areas of task assessment*	20

MODULE FOR1040: WOODS SURVIVAL 1 (SURVIVAL SKILLS) (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will: • conduct safe outdoor forest activities that have minimal environmental impact on the forest	*Assessment of student achievement should be based on:* • within a continuous timeframe of 20 or more hours, and through access to an outdoor forest environment, conducting safe outdoor activities that have minimal impact on the forest environment. Outdoor activities to demonstrate knowledge of safe techniques for: – packing and transporting gear required for a three-day trip in the outdoors. Transportation to be by human conveyance (e.g., backpack, sled) – using and maintaining outdoor tools and equipment, including knives, axes, saws, shovels, stoves and lanterns – building and using outdoor fires – constructing a fallen tree shelter, lean-to shelter, snow cave shelter or other type of emergency shelter – maintaining hygiene and sanitation while in the outdoors. *Assessment Tools* *Task Checklist: Woods Survival 1, FOR1040–3* *Lab Assessment: Outdoor Forest Experiences, FORLAB* *Standard* *Achieve a performance rating of 2 in task assessment and lab assessment* • maintaining a log/journal of outdoor experiences that provides summative reflection on: – individual and group preparedness, cooperation, responsibility – observations of the forest environment – environmental ethics. *Assessment Tool* *Reflection Guide for Outdoor Experiences, FORREF–OUT* *Standard* *Complete five log/journal entries; address criteria for reflection to a standard of 1 on the rating scale*	80

MODULE FOR1040: WOODS SURVIVAL 1 (SURVIVAL SKILLS) (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will: - **demonstrate basic competencies.**	*Assessment of student achievement should be based on:* - observations of individual effort and interpersonal interaction during the learning process. *Assessment Tool* *Basic Competencies Reference Guide and any assessment tools noted above.*	Integrated throughout

Concept	Specific Learner Expectations	Notes
Outdoor Survival Skills	*The student should:* - identify, assess, avoid and/or respond to physical hazards that may be imposed by the forest environment; e.g.: – particular terrain and conditions, including avalanche, lake and river ice, and bush travel – wildlife that may be encountered, including bears, bees, ticks, non-edible plants – changes in weather conditions that may affect personal and group safety - identify, assess, avoid and/or respond to physiological and psychological factors often associated with outdoor experiences in the forest; e.g.: – dealing with hypothermia, frostbite and dehydration – understanding fatigue and when not to move – coping with adversities, such as getting lost or hurt	Forest hazards to be aware of: - dead-topped trees - bees - poisonous plants - other wildlife - unfamiliar waters - forest fires. View films and slide shows of forest expeditions that involve physical hazards. Invite guest speakers/ community resource persons to present information and advice on expeditions in the forest. Potential linkages exist with the "First Aid in the Wilderness" certificate course (see Section H: Linkages/ Transitions).
	- list and explain necessary steps to take in emergency and survival situations in the forest; e.g.: – what to do if lost or separated from the group – first aid and emergency response to injury – construction of emergency shelters – how to gather food from edible plants – en route organizational strategies, including lead and sweep, regrouping procedures, pacing	Determine appropriate first-aid supplies. Engage students in simulation activities, role playing and case studies. Review first-aid procedures and involve students in emergency response situations.

MODULE FOR1040: WOODS SURVIVAL 1 (SURVIVAL SKILLS) (continued)

Concept	Specific Learner Expectations	Notes
	The student should:	
Outdoor Survival Skills (continued)	• select appropriate personal and group gear for outdoor forest activities; e.g.: – personal gear, with consideration to maintaining body temperature and protection from injury – group gear, to meet requirements for food, shelter, travel and emergencies	Have students present a "fashion show" or produce a video that demonstrates appropriate equipment and its use.
	• demonstrate safe use and appropriate care of outdoor hand tools, including knives, axes and saws	Conduct an equipment maintenance clinic.
	• demonstrate safe procedures for building and using outdoor fires; e.g.: – signalling – warming – cooking	Practise fire building techniques—then plan and carry out a schoolyard "cookout."
	• explain techniques used to plan, pack, carry and prepare foods during outdoor forest expeditions; e.g.: – nutritional requirements – portability and preservation factors – food preparation techniques – safe use of campfires	Involve students in menu planning for a hypothetical or proposed field trip.
	• explain techniques required for maintaining hygiene during outdoor forest expeditions; e.g.: – water purification – personal cleanliness – group hygiene.	Invite guest speakers from a health department or from national/ provincial parks.

MODULE FOR1040: WOODS SURVIVAL 1 (SURVIVAL SKILLS) (continued)

Concept	Specific Learner Expectations	Notes
Forest Expeditions	*The student should:* • plan and conduct safe outdoor expeditions in the forest; e.g.: – research information from a variety of sources, including maps, aerial photographs, guidebooks, journals and local experts – interpret route information by selecting reasonable destinations, estimating travel time and anticipating obstacles – apply knowledge and skills while en route, including map reading and compass skills, knowledge of terrain and route selection, and mapping of key landmarks and directions	Examine maps, research books, reference materials, etc., on particular field sites to be visited. Access alternative routes with regard to time and preparation required for each. Conduct map reading and basic orienteering exercises in the school yard.
	• use appropriate travel modes and equipment to safely participate in outdoor activities in the forest; e.g.: – hiking/backpacking – cross-country skiing – snowshoeing – canoeing	Plan and implement a sequence of skill development activities with a follow-up excursion. Discuss appropriate use of the walking staff.
	• practise safe and unobtrusive techniques to examine and observe the forest environment; e.g.: – plant/animal identification – forest layers – outdoor hazards – signs of human impact	Reference activities suggested in *The Art of Seeing and Tracking*. Discuss appropriate techniques for bird watching in a forest environment. Observe: • forest regeneration • signs of forest pests • animal tracks and scat.
	• acquire and apply minimal impact skills while participating in outdoor forest expeditions; e.g.: – proper trail use, including the avoidance of trail widening – campsite care, including the use of fires and stoves, tent site selection, and firewood selection – waste disposal techniques, including latrines, waste water disposal and garbage.	Discuss principles of "ecotourism." Consider carrying capacity of a forested area in relation to minimum environmental impact. Set up a model campsite in the school yard or a local park.

MODULE FOR1050: MAPPING & AERIAL PHOTOS

Level: Introductory

Theme: Technology and Applications

Prerequisite: None

Module Description: Students interpret information from different types of maps and aerial photographs used in the forestry industry.

Module Parameters: Access to forest maps and aerial photographs.

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• **describe different types of maps and aerial photographs used in forestry**	• preparing and presenting a portfolio that includes: – four or more different types of maps used in forestry, and explanations of the characteristics and applications of each – a one-page report on the National Topographic Grid System and its application in providing legal land descriptions – the results of research conducted on the goals and techniques of aerial photography. *Assessment Tool* *Portfolio Assessment: Maps Used in Forestry, FOR1050–1* *Standard* *Complete all portfolio components to a standard of 1 on the rating scale*	20
• **interpret and apply information from maps and aerial photographs**	• performing practical orienteering tasks that involve the use of information conveyed through maps. Tasks to include: – orienting a map through inspection of surroundings and use of a compass – obtaining bearings from a map using a compass – measuring direction using a Douglas protractor – given a legal land description, locating the parcel of land on a map. *Assessment Tool* *Task Checklist: Orienteering, FOR1050–2* *Lab Assessment: Outdoor Forest Experiences, FORLAB* *Standard* *Achieve a performance rating of 1 in task assessment and lab assessment*	50

BEST COPY AVAILABLE

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:* • describing topography and forest cover for a given area based on information gathered from: – an aerial photograph and corresponding parts of a forest type map – two or more different types of aerial photographs (e.g., black and white, colour, infrared, satellite imagery). *Assessment Tool* *Knowledge/Application Assessment: Reading and Interpreting Forest Maps, FOR1050–3* *Standard* *Respond to a standard of 1 on the rating scale*	
• demonstrate procedures used to create maps	• constructing a simple map that represents a local forested area. Map to display scale, legend, major land and forest features and topography. *Assessment Tool* *Task Checklist for Mapping, FORMAP* *Standard* *Complete applicable mapping tasks to a standard of 1 on the rating scale*	20
• identify careers in the forest industry relevant to mapping and aerial photography	• given current information on career opportunities in mapping and aerial photography, completing a research project on one or more related occupations. *Assessment Tool* *Career Search: Introductory Level, FORCAR–1* *Standard* *Conduct research to a standard of 1 on the rating scale*	10
• demonstrate basic competencies.	• observations of individual effort and interpersonal interaction during the learning process. *Assessment Tool* *Basic Competencies Reference Guide and any assessment tools noted above*	Integrated throughout

MODULE FOR1050: MAPPING & AERIAL PHOTOS (continued)

Concept	Specific Learner Expectations	Notes
	The student should:	
Applications of Maps and Aerial Photographs	• describe different types of maps used in forestry; e.g.: – base maps – topographic/contour maps – soil type maps – forest stand or type maps	Contact the Canadian Forestry Service (Natural Resources Canada) or local forest industry to request different types of maps used in forestry. Obtain maps and photos of locally known areas from Alberta Environmental Protection.
	• describe components and applications of the National Topographic Grid System and the Western Grid Survey System	See related topics and resources in the Agriculture strand (AGR3120: Soils Management 2).
	• explain the purpose and techniques of aerial photography	Contact industry and/or government resource persons.
	• describe applications of different types of film used in aerial photography; e.g.: – black and white – black and white infrared – colour – colour infrared	See "JFW Green Tree Trailblazer Leader Manual," *Woodstravel*, pp. 117–216).
	• describe information-gathering technologies and their applications in mapping; e.g.: – satellite imagery – global positioning systems (GPS) – geographic information systems (GIS).	Contact RADARSAT International (3851 Shell Road, Suite 200, Richmond, British Columbia) for current information regarding applications of satellite remote sensing in mapping Canada's forest resources.

Concept	Specific Learner Expectations	Notes
	The student should:	
Interpreting Maps and Aerial Photographs	• orient forestry maps through: – inspection – use of a compass	Read and interpret maps/photos of locally known areas.
	• identify bearings from a map using a forestry compass • calculate direction using a Douglas protractor	See map interpretation activities provided in: • *Orienteering, Level I* • *Orienteering, Level II.*
	• read and interpret maps and aerial photographs, explaining information conveyed through: – legend and symbols – scale – colours – contour lines	Develop a series of mapping activities—start with locating dots in the classroom, then markers around the school, and finally markers around a park or wooded area.
	• locate a specific parcel of land on a map by using its legal survey description	See related topics and resources in the Agriculture strand (AGR3120: Soils Management 2).
	• describe land terrain from information conveyed through maps • estimate and calculate distance and area on maps	Consider links with the mathematics program: • scale diagrams • ratio and proportion • estimation.
	• demonstrate applications of aerial photographs in the stereoscopic viewing of topographic features • compare details of forest type maps and aerial photographs with existing ground conditions.	Discuss the theory behind stereoscopic vision and techniques used to train the eye.
Making Maps	• construct a map that provides information about a forested area; e.g.: – pace/measure area to be mapped – gather information regarding land/forest features – determine map scale – prepare a legend – plot major land/forest features	Create a simple topographical map of a local area.

MODULE FOR1050: MAPPING & AERIAL PHOTOS (continued)

Concept	Specific Learner Expectations	Notes
Making Maps (continued)	*The student should:* • explain how information from aerial photographs is used to construct two-dimensional maps • compare details of an aerial photograph with corresponding parts of a forest type map.	Use aerial photographs to create a simple map. If time permits, create a photo mosaic by arranging consecutive aerial photographs along a flight path.
Career Opportunities	• research potential careers and the range of occupational opportunities in mapping and aerial photography: – professional – technical – labour-based	Interview people employed in careers that involve mapping and aerial photography. Identify some general areas of specialization.
	• describe employment statistics within one or more areas of specialization; e.g.: – types of careers – number of workers – employment trends	Review National Occupational Profiles (NOC).
	• infer career opportunities and trends from employment statistics • infer impacts of technology development on employment opportunities	Contact the "Career Hotline" (telephone 1-800-661-3753).
	• predict future information-gathering techniques likely to be used in the forest industry, and resulting career opportunities.	Contact senior management people in the forest industry; also users of information-gathering technologies (e.g., GPS, GIS).

MODULE FOR1060: MEASURING THE FOREST 1 (MEASUREMENT SKILLS)

Level: Introductory

Theme: Technology and Applications

Prerequisites: FOR1050 Mapping & Aerial Photos
Emergency First Aid (current certification)

Module Description: Students demonstrate basic forest measurement skills, and apply these skills to sample fibre values in a forested region.

Module Parameters: Access to a demonstration forest and forest measurement tools.

Instructor training (current certification) in Standard Level First Aid is required.

See Section C (Planning for Instruction) and Section H (Linkages/Transitions) for further information on instructor training and certification.

Supporting Module: CTR1210 Personal Safety (Management) [Career Transitions Strand]

Because of the practical nature of this module, students must have a general knowledge of basic first-aid and survival techniques relevant to forest environments. See Planning for Instruction in Section C for further information on student safety.

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will: • explain the goals and techniques of conducting forest surveys	*Assessment of student achievement should be based on:* • completing a research project on the goals and techniques of conducting a forest survey. Research to address: – reasons for conducting forest surveys – techniques used to sample a forested area – how sample data is used to estimate forest populations. *Assessment Tool* *Research Process: Forest Surveys, FOR1060–1* *Standard* *Conduct research to a standard of 1 on the rating scale*	10

BEST COPY AVAILABLE

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• **demonstrate basic compass and measurement skills used in forest inventory practices**	• using a compass in the outdoors to orient a map, obtain a bearing, and perform a closed traverse (error in closure no greater than 5% of perimeter distance). *Assessment Tool* *Task Checklist: Orienteering, FOR1060–2* *Lab Assessment: Outdoor Forest Experiences, FORLAB* *Standard* *Achieve a performance rating of 1 in task assessment and lab assessment*	70
	• given access to a plot of forested land, measuring chain, diameter tape, clinometer and increment borer, measuring (accurate to within 5%): – horizontal distances up to 25 metres – the diameter of 10 trees – the height of 10 trees – the age of 10 trees. *Assessment Tool* *Task Checklist: Forest Measurement, FOR1060–3* *Lab Assessment: Outdoor Forest Experiences, FORLAB* *Standard* *Achieve a performance rating of 1 in task assessment and lab assessment*	
• **gather sample data regarding fibre volumes in a forested region**	• given access to a plot of forested land and suitable measurement tools, conducting (with assistance) a survey of fibre values in the region by: – establishing boundaries for a sample plot – measuring tree diameter, height and age within the plot – estimating fibre volumes from sample data. *Assessment Tool* *Task Checklist: Forest Survey, FOR1060–4* *Lab Assessment: Outdoor Forest Experiences, FORLAB* *Standard* *Achieve a performance rating of 1 in task assessment and lab assessment*	20

MODULE FOR1060: MEASURING THE FOREST 1 (MEASUREMENT SKILLS) (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will: • demonstrate basic competencies.	*Assessment of student achievement should be based on:* • observations of individual effort and interpersonal interaction during the learning process. *Assessment Tool* *Basic Competencies Reference Guide and any assessment tools noted above.*	Integrated throughout

Concept	Specific Learner Expectations	Notes
Forest Surveys	*The student should:* • identify reasons for conducting a forest survey; e.g.: – types of information gathered – questions that are answered • distinguish between forest samples and forest populations • describe basic techniques used to sample a forested area; e.g.: – layout of sample plots – data collection techniques • explain how sample data may be used to estimate fibre volumes and other nonfibre forest resources.	Invite resource persons from government, industry and/or professional associations. See *Alberta's Focus on Forests* (Activity 4.3–Surveying the Forest Resource).
Compass and Measurement Skills	• demonstrate basic compass skills to establish direction in the forest; e.g.: – orient a map – establish and follow a bearing • calculate horizontal distance in the forest using pacing and chaining skills • demonstrate open and closed traverses in the forest using compass and chaining skills • calculate the diameter of trees using a diameter tape or other suitable equipment	Develop basic skills in measuring direction and distance in the forest. Invite resource persons from local government/ industry to demonstrate: • compass and chain skills • techniques in measuring the forest.
Compass and Measurement Skills (continued)	• calculate the height of trees using a clinometre and measuring tape or other suitable equipment	Borrow necessary equipment from local government/industry organizations.

MODULE FOR1060: MEASURING THE FOREST 1 (MEASUREMENT SKILLS) (continued)

Concept	Specific Learner Expectations	Notes
	The student should: • demonstrate techniques used to determine the age of trees.	Use short pieces of logs.
Sampling Technique	• demonstrate compass and chaining skills to establish boundaries for a sample forest plot • identify safety practices and policies relevant to gathering sample data in the forest • describe data regarding one or more aspects of the fibre resource within the sample forest plot; e.g.: – tree height/diameter – number and distribution of species – age of trees • record sample data in appropriate tables and/or charts • interpret sample data to make inferences regarding tree populations and fibre values in the forest region • manipulate sample data as required to estimate fibre volumes.	Contact local government/ industry to obtain existing sample data.

MODULE FOR1090: FOREST ECOLOGY 1 (ECOSYSTEM DYNAMICS)

Level: Introductory

Content Focus: Management and Conservation

Prerequisite: None

Module Description: Students investigate forest ecosystems, and explain the structure and functioning of trees.

Module Parameters: Access to a science laboratory and/or forest environment.

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• describe interrelationships among elements in the forest ecosystem	• given access to information on forest ecology, completing a research project that examines: – interrelationships among at least three living and three nonliving elements – predator–prey–decomposer relationships – distribution of species on the basis of habitat requirements. *Assessment Tool* *Research Process: Forest Ecosystems, FOR1090–1* *Standard* *Complete all components of research to a standard of 1 on the rating scale*	50
• describe structural units of the tree and their function in performing life processes	• identifying and describing major tree parts (including roots, trunk, branches, leaves, flowers), their function and relationship to one another. *Assessment Tool* *Knowledge/Application Assessment: Structural Units of the Tree, FOR1090–2* *Assessment Criteria: Diagrams and Technical Drawings, FORDRA* *Standard* *Respond to a standard of 1 on the rating scale*	50

MODULE FOR1090: FOREST ECOLOGY 1 (ECOSYSTEM DYNAMICS)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:* • conducting directed laboratory and/or field investigations that demonstrate three or more vital life processes performed by trees (e.g., nutrient uptake, photosynthesis, respiration, transpiration, reproduction). *Assessment Tool* *Lab Investigations: Tree Biology, FOR1090–3* *Standard* *Complete lab and/or field investigations to a standard of 1 on the rating scale*	
• demonstrate basic competencies.	• observations of individual effort and interpersonal interaction during the learning process. *Assessment Tool* *Basic Competencies Reference Guide and any assessment tools noted above*	Integrated throughout

Concept	Specific Learner Expectations	Notes
	The student should:	
Forest Ecosystems	• define and provide examples of: – ecology/ecosystems – abiotic/biotic factors – abiotic/biotic interactions – populations – communities – succession	**This module involves the application of ecosystem concepts within a forest environment.** Use field trips to provide opportunities for the first-hand observation of components of a forest ecosystem.
	• identify living and nonliving elements within a local forest ecosystem; e.g.: – soil characteristics – land form – climate – flora and fauna – soil organisms	Observe forest layers (e.g., canopy, understory). Observe succession at the edge of clearings and fields, spruce under a pine forest, erosion along a river bank, old burn, etc.

Concept	Specific Learner Expectations	Notes
	The student should:	
Forest Ecosystems (continued)	• describe the interrelatedness of elements within a local forest environment; e.g.: – relationship of soil, air and water characteristics to plant growth – interactions and dependencies among living organisms • explain the role of trees within a local forest ecosystem; e.g.: – exchange of gases – water cycle – nutrient cycling – wildlife habitat – soil conservation	Conduct experiments to demonstrate the interrelatedness of air, water, soil and plant growth. Observe evidence of plant growth being affected by particular environmental conditions (e.g., light, soil, moisture, crowding).
	• describe food relationships among living organisms within a local forest environment; e.g.: – role of producers, consumers and decomposers – food chains and webs • compare the ecological niches of selected plant and animal species native to Alberta.	Draw food webs/energy chains based on observations; e.g.: • fungal damage • insect damage • wildlife browsing. Observe evidence of insect or other animal life living on a tree or shrub. Collect and observe samples of insects by placing a sheet of plastic under the plant and tapping branches with a stick.
Tree Biology	• explain the vital life processes performed by trees and other forest plants; e.g.: – nutrient intake and transportation – photosynthesis – respiration and transpiration – reproduction – phrenology (leaf flushings, leaf fall, flowering and cone production)	Conduct laboratory experiments and demonstrations to examine life functions. Draw and label a cross-section of a tree (top to bottom) that illustrates structural units and component parts.

MODULE FOR1090: FOREST ECOLOGY 1 (ECOSYSTEM DYNAMICS)

Concept	Specific Learner Expectations	Notes
	The student should:	
Tree Biology (continued)	• describe structural units and component parts of the tree, and their function in performing vital life processes; e.g.: – root – trunk/stem – leaf – flower	Use a microscope to observe and draw stomata and cells. Prepare a model by using a small tree; label all parts of the tree. Make tree discs; identify cross-sectional parts (e.g., cambium, sapwood, heartwood).
	• infer interrelationships among tree structures, their functions, and vital life processes that are performed	Consider relationships among root, trunk, branch, leaf and flower.
	• show the approximate range of one or more tree species throughout North America.	Discuss information conveyed through annual tree rings; examine the grain in dimensional lumber.

MODULE FOR1100: FORESTS FOREVER 1 (FOREST USE & PROTECTION)

Level: Introductory

Theme: Management and Conservation

Prerequisite: None

Module Description: Students describe past and present uses of Canada's forests, and explain how research and technology assist in forest management.

Module Parameters: Access to government and industry organizations responsible for the sustainable management of forests (e.g., Alberta Environmental Protection, Canadian Forestry Service).

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• describe past and present uses of forests in Alberta and Canada	• identifying and explaining: – past and present uses of forests in Alberta and Canada – ways in which changes in forest use (and management) have affected the economy and the environment. *Assessment Tool* *Knowledge/Application Assessment: Forest Use, FOR1100–1* *Standard* *Respond to a standard of 1 on the rating scale*	20
• explain how the consumptive and nonconsumptive use of forests has created a need for conservation and sustainable management of forested regions	• definitions and examples of sustainable yield and sustainable development within the context of Alberta's forested regions. *Assessment Tool* *Knowledge/Application Assessment: Sustainability, FOR1100–2* *Standard* *Respond to a standard of 1 on the rating scale*	30

BEST COPY AVAILABLE

MODULE FOR1100: FORESTS FOREVER 1 (FOREST USE & PROTECTION) (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
	• given a current issue regarding the management of a forested region: – negotiating and debating the issue while assuming the role of one or more stakeholder groups – preparing and presenting a position paper that outlines a responsible course of action. *Assessment Tool* *Negotiation and Debate: Introductory Level, FORNEG–1* *Position Paper: Forest Management, FOR1100–3* *Standard* *Address criteria in negotiation/debate and the position paper to a standard of 1 on the rating scale*	
• describe the role of research and technology in forest protection	• completing a research project on major components of forest protection. *Assessment Tool* *Research Process: Components of Forest Protection, FOR1100–4* *Standard* *Complete all components of research to a standard of 1 on the rating scale* • given access to a forest environment, identifying instances of pest and/or fire damage. Identification will involve: – collecting and/or photographing pest problems – correctly identifying four or more forest pests – recommending appropriate prevention/control strategies for each pest identified. *Assessment Tool* *Task Checklist: Identifying Forest Pests, FOR1100–5* *Identification Key for Forest Pests, FOR1100–6* *Lab Assessment: Outdoor Forest Experiences, FORLAB* *Standard* *Achieve a performance rating of 1 in task assessment and lab assessment*	50
• demonstrate basic competencies.	• observations of individual effort and interpersonal interaction during the learning process. *Assessment Tools* *Basic Competencies Reference Guide and any assessment tools noted above*	Integrated throughout

MODULE FOR1100: FORESTS FOREVER 1 (FOREST USE & PROTECTION) (continued)

Concept	Specific Learner Expectations	Notes
	The student should:	
Forest History	• describe changing patterns of forest use in Canada and Alberta from past to present • describe the history of the management of forested lands in Canada and Alberta • infer the impact of historical trends in forest use and ownership on people, the economy and the environment • make predictions about the use of Canada's forest resources in the future.	Trace the development of Alberta's forest land acts, policies and agencies. Supplementary reference materials include: • *A Forest Journey – The Role of Wood in the Development of Civilization* (Harvard University Press) • *Canadian Forestry – The View Beyond the Trees* (Macmillan of Canada).
Conservation and Management	• compare different uses of forested regions in terms of their advantages and disadvantages; e.g.: – environmental – economic – social	Invite resource persons from relevant government agencies and local forest industry.
	• describe the roles of different interest groups in managing the forest resource; e.g.: – government – forest industry – general public – other stakeholder groups	Prepare a poster/collage/display that depicts different aspects of forest use.
	• relate concepts of sustainable development and sustained yield to practical strategies for managing the forest resource; e.g.: – reforestation – stand improvement	Visit local forest sites.
	• describe an issue regarding sustainable development and/or sustained yield; e.g.: – conduct research – develop a position – participate in debate	Develop strategies for debate and consensus building (e.g., selective versus clearcut logging practices). Invite resource people from the community to critique debates.
	• explain demands that are placed on forested regions of Canada and Alberta; e.g.: – industry – recreation – wildlife – environment	

MODULE FOR1100: FORESTS FOREVER 1 (FOREST USE & PROTECTION) (continued)

Concept	Specific Learner Expectations	Notes
Conservation and Management (continued)	*The student should:* • identify a plan for the integrated use of a local forested area; e.g.: – conduct research – generate alternatives – agree to a workable solution.	Examine existing management plans.
Forest Protection	• explain reasons for protecting the forest resource; e.g.: – material and non-material benefits – environmental impact	Prepare a display of technologies used in forest protection.
	• identify and describe major components of forest protection; e.g.: – forest fire management – soil conservation and land reclamation – pest and disease management	Invite a local forest ranger to explain components/ techniques of forest protection. Compare and contrast the consequences of forest fires and logging practices.
	• explain basic goals and techniques of forest fire management, soil conservation and land reclamation • identify and describe symptoms of common forest pests and diseases	Explain the fire triangle and methods used to control fire by removing one or more legs of the triangle.
	• compare different methods of pest and disease control; e.g.: – biological methods – forest management – chemical methods.	Visit a cutblock and examine for successful regeneration. Visit a plantation/tree nursery and examine seedlings.

MODULE CURRICULUM AND ASSESSMENT STANDARDS:

SECTION E: INTERMEDIATE LEVEL

The following pages define the curriculum and assessment standards for the intermediate level of Forestry.

> Intermediate level modules help students build on the competencies developed at the introductory level and focus on developing more complex competencies. They provide a broader perspective, helping students recognize the wide range of related career opportunities available within the strand.

Module FOR2010: Making a Difference (Protection & Stewardship) E.3
Module FOR2030: Managing Alberta Forests E.9
Module FOR2040: Woods Survival 2 (Wilderness Excursion) E.15
Module FOR2060: Measuring the Forest 2 (Sampling Technique) E.21
Module FOR2070: Harvesting Practices (Fibre Harvest & Processing) E.25
Module FOR2100: Forests Forever 2 (Management Practices) E.31
Module FOR2120: Users in the Forest E.35

MODULE FOR2010: MAKING A DIFFERENCE (PROTECTION & STEWARDSHIP)

Level: Intermediate

Theme: Social and Cultural Perspectives

Prerequisite: None

Module Description: Students analyze the impact of attitudes, actions and lifestyles on forests, and propose individual and shared actions that foster environmental stewardship.

Module Parameters: Access to government and industry organizations responsible for sustainable forest development and environmental stewardship.

Note: Although this module involves analyzing the impact of lifestyle on forests, the major emphasis is on "doing" (i.e., commitment/empowerment through personal and shared actions).

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• **describe the impact of personal attitudes, actions and lifestyle on the forest resource**	• maintaining a log/journal of reflections and inferences regarding the impact of daily living activities on the forest environment. *Assessment Tool* *Reflection Guide for Environmental Responsibility/Citizenship, FORREF–ENV* *Guide to Inferences: Personal Impact on Forests, FOR2010–1* *Standard* *Complete five log/journal entries; address criteria for reflection and inferences to a standard of 2 on the rating scale*	10
• **explain strategies for reducing, reusing and recycling**	• completing all components of a research project on four or more products recently developed through recycling techniques. *Assessment Tool* *Research Process: Recycling Techniques, FOR2010–2* *Standard* *Complete research to a standard of 2 on the rating scale*	30

BEST COPY AVAILABLE

MODULE FOR2010: MAKING A DIFFERENCE (PROTECTION & STEWARDSHIP)
(continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
	• identifying economic and environmental trade-offs that occur through reducing, reusing and recycling. *Assessment Tool* *Issue Analysis: Reducing, Reusing and Recycling, FOR2010–3* *Standard* *Address criteria in issue analysis to a standard of 2 on the rating scale*	
• **demonstrate, through personal and shared actions, commitment to environmental responsibility/citizenship**	• negotiating and debating an issue regarding the impact of lifestyle on forest environments. *Assessment Tool* *Negotiation and Debate: Intermediate Level, FORNEG–2* *Standard* *Address criteria in negotiation/debate to a standard of 2 on the rating scale*	60
	• a proposal and rationale (oral, written or visual) for: – one personal action that will affect forest ecosystems in positive ways – one leadership role/community program in support of environmental stewardship. *Assessment Tool* *Assessment Criteria: Proposal for Environmental Action, FORPRO* *Standard* *Complete each proposal to a standard of 2 on the rating scale*	
	• volunteering five hours of time working with an environmental, forest industry or professional organization whose major goal is sustainable forest development. *Assessment Tool* *Log/Verification of Volunteer Work, FORLOG-VOL(a)* or *FORLOG–VOL(b)* *Standard* *Complete all sections of the log/verification for 5 hours of volunteer work*	

BEST COPY AVAILABLE

MODULE FOR2010: MAKING A DIFFERENCE (PROTECTION & STEWARDSHIP)
(continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:* • a letter written to a government official, industry representative or environmental organization expressing support or concern regarding action taken on a forestry issue, and a critique of the response received. *Assessment Tool* *Assessment Criteria: Letters of Support or Concern, FORLET* *Standard* *Complete the letter and critique to a standard of 2 on the rating scale*	
• demonstrate basic competencies.	• observations of individual effort and interpersonal interaction during the learning process. *Assessment Tools* *Basic Competencies Reference Guide and any assessment tools noted above*	Integrated throughout

Concept	Specific Learner Expectations	Notes
	The student should:	
Attitudes, Actions and Lifestyle	• explain how societal attitudes, actions and lifestyle may affect the forest resource; e.g.: – conservation ethic – consumer practices – recreational patterns	Plan for student-directed projects. Encourage students to express personal views and values.
	• describe factors that influence consumer and marketing trends, and how these trends may affect the forest resources; e.g.: – social – economic – environmental	Consider 10 personal actions and their consequences on the forest. See *Alberta's Focus on Forests* (Activity 5.6–What's in the Waste-basket–Reassessing Our Needs).
	• create a personal inventory of possessions and material purchases made over the last year	
	• distinguish among personal needs and wants, as reflected through personal inventory	
	• evaluate the impacts of personal actions and lifestyle on the forest resource.	Facilitate student debates.

MODULE FOR2010: MAKING A DIFFERENCE (PROTECTION & STEWARDSHIP) (continued)

Concept	Specific Learner Expectations	Notes
Reduce, Reuse and Recycle	*The student should:* • describe and assess societal trends in the consumption of material goods • identify common refuse that can be reused in practical and economical ways • describe materials that are being recycled and the products that are produced • describe trade-offs that occur through reducing, reusing and recycling; e.g.: – economic – environmental.	Consider linkages with Energy and Mines (ENM1090: Fundamentals of Recycling). Examples: • fence posts • jewelry • paper • synthetic fibres. Consider the advantages and disadvantages of • disposable cups versus reusable cups • disposable diapers versus cloth diapers.
Environmental Responsibility/ Citizenship	• identify personal strategies for using the forest resource that foster the attainment of social, cultural, economic and environmental goals; e.g.: – personal actions – leadership roles • plan, conduct and assess a school-wide campaign to increase awareness of lifestyle, conservation and the environment; e.g.: – establish goals – plan and conduct – assess results • explain an issue regarding the impacts of lifestyle on the forest resource; e.g.: – conduct research – develop a position – participate in debate	Develop consensus on a relevant issue. Ask students to prepare a contract expressing personal commitment to environmental stewardship. Review the contract after a period of time to ascertain if contract obligations are being met. Consider using case studies and simulations provided in ***A Forest For All***, a multimedia kit developed by the Canadian Forest Products Association and distributed by Marwil Communications.

MODULE FOR2010: MAKING A DIFFERENCE (PROTECTION & STEWARDSHIP) (continued)

Concept	Specific Learner Expectations	Notes
Environmental Responsibility/ Citizenship (continued)	*The student should:* • identify constructive ways in which individuals can influence public decisions that affect the forest and all its resources; e.g.: – voting – lobbying – seeking office – supporting compatible interest groups • describe the goals and objectives of one or more conservation groups.	Write letters of support and/or concern to government agencies, industry and/or environmental groups. Critique the responses that are received.

MODULE FOR2030: MANAGING ALBERTA FORESTS

Level:	Intermediate
Theme:	Social and Cultural Perspectives
Prerequisite:	None
Module Description:	Students research agencies and structures used to manage forested lands in Alberta.
Module Parameters:	Access to government agencies responsible for forest management (e.g., Alberta Environmental Protection, Parks Canada).

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will: • explain how Alberta's forested lands are managed	*Assessment of student achievement should be based on:* • preparing and presenting a report (written, oral or multimedia) that explains how Alberta's forested lands are administered. Report to include: – a timeline of changes that have occurred in the ownership and administration of forested lands – a map and explanation of different land tenures (public and private) – a list of five or more agencies responsible for managing forested lands within Alberta's boundaries, and the mandates of each agency. *Assessment Tool* *Presentations/Reports: Managing Alberta's Forested Lands, FOR2030–1* *Sample Timeline: Management History of Alberta's Forested Lands, FOR2030–2* *Task Checklist for Mapping, FORMAP* *Standard* *Complete all components of the report to a standard of 2 on the rating scale*	20

MODULE FOR2030: MANAGING ALBERTA FORESTS (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• describe government legislation and policies that influence the use of Alberta's forest resource	• summarizing the general intent and major roles of: – important government legislation in managing the forest – regulations and/or guidelines established in association with government legislation for managing the forest. *Assessment Tool* *Sample Acts and Regulations for Managing Alberta's Forests, FOR2030–3* *Standard* *Summarize four important government legislation and four regulations and/or guidelines*	40
• explain methods of allocating land and timber in forest management	• given access to current resources on forest management in Alberta, completing a research project that examines the intent of five or more: – timber dispositions issued by Alberta Land and Forest Services – other types of dispositions used to manage nonfibre aspects of forest use. *Assessment Tool* *Research Process: Allocation Procedures for Land and Timber, FOR2030–4* *Standard* *Complete all components of research to a standard of 2 on the rating scale*	40
• demonstrate basic competencies.	• observations of individual effort and interpersonal interaction during the learning process. *Assessment Tools* *Basic Competencies Reference Guide and any assessment tools noted above*	Integrated throughout

MODULE FOR2030: MANAGING ALBERTA FORESTS (continued)

Concept	Specific Learner Expectations	Notes
	The student should:	
Administration of Forested Lands	• describe major changes that have occurred from past to present in the ownership and administration of forested lands in Alberta: – federal jurisdiction – provincial status – *Natural Resources Transfer Act*	Use archives, films and library resources to research the history of forestry in Alberta. Explain how the management of Alberta's forested lands became a responsibility of the provincial government.
	• describe different land tenures in Alberta today: – public (provincial and federal crown lands) – private • identify, locate and compare different land management areas in Alberta: – white area – green area	Contact Alberta Environmental Protection to obtain maps of land management areas in Alberta. Construct a circle graph depicting the distribution of land ownership in Alberta (e.g., provincial public, provincial private, federal public, aboriginal lands).
	• describe the mandates of agencies or groups responsible for managing forested lands within Alberta's boundaries, and the proportion of land under their jurisdiction.	For example, • Alberta Environmental Protection (Land and Forest Services, Parks Services, Fish and Wildlife Services) • Parks Canada • private ownership • Metis or Native Indian • Forestry Canada.

Concept	Specific Learner Expectations	Notes
	The student should:	
Government Legislation and Policies	• explain how activities in Alberta's forests are subject to a variety of government legislation and regulations	Contact Alberta Environmental Protection (or Queen's Printer, Province of Alberta) to request various legislation, regulations and guidelines used in managing forested lands.
	• research the role of important government legislation in managing the forest	For example, • *Forest Act* • *Forest Reserves Act* • *Forest and Prairie Protection Act* • *Provincial Parks Act* • *Wilderness Areas, Ecological Reserves and Natural Areas Act.*
	• research the role of regulations and guidelines established in association with government legislation in further managing the forest	For example, • Timber Management Regulation • Timber Operating Groundrules • Reforestation Standards • Forest and Prairie Protection Regulation (Part I and II) • Forest Land Use Regulation (Recreation, Mineral, Pipeline, Grazing).
	• assess the short- and long-term effects of selected government legislation and regulations on forested land.	**Avoid detailed analysis of acts and regulations; focus on an OVERVIEW ONLY.**
Allocation Procedures	• explain the use of dispositions in managing commercial activities on forested lands	For example, authorizations in the form of permits, licences or other legal agreements.
	• identify criteria used to establish forest land and timber dispositions	Consider different public land users/uses. For example, • fibre production • recreation • agriculture • wildlife habitat • integrated use.

MODULE FOR2030: MANAGING ALBERTA FORESTS (continued)

Concept	Specific Learner Expectations	Notes
	The student should:	
Allocation Procedures (continued)	• explain the intent of different timber dispositions issued by the Alberta Forest Service, and the responsibilities of holders of these dispositions	For example, • Forest Management Agreements (FMAs) • Quota Certificates • Timber Licences • Commercial Timber Permits • Local Timber Permits.
	• describe other types of dispositions that are used to manage nonfibre aspects of forest use	For example, • grazing • hunting, fishing and trapping • energy and mineral development • commercial trail riding.
	• research the role of consultation (with other resource users) and public involvement in establishing land and timber dispositions.	Involve students in role-playing activities.

MODULE FOR2040: WOODS SURVIVAL 2 (WILDERNESS EXCURSION)

Level: Intermediate

Theme: Social and Cultural Perspectives

Prerequisites: FOR1040 Woods Survival 1 (Survival Skills)
Emergency First Aid (current certification)

Module Description: Students plan, prepare for and conduct an extended outdoor wilderness trip in the forest.

Module Parameters: Access to an outdoor forest environment and gear for outdoor expeditions.

Instructor training (current certification) in Standard Level First Aid is required; instructor training in First Aid in the Wilderness is recommended.

Teachers may wish to access the services of a qualified Outdoor Guide in delivering components of this module.

Off-campus learning activities must be commensurate with previous levels of wilderness training and experience; day trips should precede extended overnight trips; experience in hardcover camping should precede potential softcover camping and/or emergency shelter camping opportunities.

See Section C (Planning for Instruction) and Section H (Linkages/Transitions) for further information on instructor training and certification.

Supporting Modules: FOR1050 Mapping & Aerial Photos
CTR1210 Personal Safety (Management) [Career Transitions Strand]

Because of the practical nature of this module, students must have a general knowledge of basic first-aid and survival techniques relevant to wilderness environments. See Planning for Instruction in Section C for further information on student safety.

Note: FOR1040 and FOR2040 (Woods Survival 1 and 2) provide opportunities for interaction with a forest environment at a personal level. This module sequence should place emphasis on developing skills that will permit safe travel and outdoor experiences within one or more of Alberta's forest environments.

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will: • present a plan for an extended outdoor wilderness trip in the forest	*Assessment of student achievement should be based on:* • developing and presenting a collaborative group plan for an extended outdoor wilderness trip in the forest. *Assessment Tools* *Task Checklist: Woods Survival 2, FOR2040–1* Trip Planning *Standard* *Complete each component of trip planning to a standard of 2 on the rating scale*	20

BEST COPY AVAILABLE

MODULE FOR2040: WOODS SURVIVAL 2 (WILDERNESS EXCURSION) (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will: • conduct and conclude, safely, an extended outdoor wilderness trip in the forest with minimal impact on the environment	*Assessment of student achievement should be based on:* • within a continuous timeframe of at least 72 hours, and through access to a forest environment, implementing the collaborative group plan established above for an outdoor wilderness trip. The student will demonstrate procedures for: – setting up camp – preparing meals – complying with pertinent legislation – breaking camp – ensuring least possible environmental impact. *Assessment Tools* *Task Checklist: Woods Survival 2, FOR2040–1* *Lab Assessment: Outdoor Forest Experiences, FORLAB* National Occupational Standards for Outdoor Guide *Standard* *Conduct and conclude the trip to a standard of 2 on the rating scale* • successfully participating in four or more activities while en route that involve personal interaction with the forest environment. *Assessment Tool* *Task Checklist: Woods Survival 2, FOR2040–1* *Lab Assessment: Outdoor Forest Experiences, FORLAB* *Standard* *Complete four of the activities (as outlined in the task checklist) that involve personal interaction with the forest environment to a standard of 2 on the rating scale* • a post-trip assessment that provides observations and personal impressions, and summarizes: – activities well done – problems encountered and suggested solutions – recommendations regarding future trips. *Assessment Tool* *Post-Trip Assessment for Woods Survival 2, FOR2040–2* *Standard* *Achieve a performance rating of 2 in applicable areas of post-trip assessment*	80

MODULE FOR2040: WOODS SURVIVAL 2 (WILDERNESS EXCURSION) (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will: • **demonstrate basic competencies.**	*Assessment of student achievement should be based on:* • observations of individual effort and interpersonal interaction during the learning process. *Assessment Tool* *Basic Competencies Reference Guide and any assessment tools noted above*	Integrated throughout

Concept	Specific Learner Expectations	Notes
	The student should:	
Trip Planning and Preparation	• identify specific objectives for an outdoor wilderness trip; e.g.: – goals and expectations – length of trip – destination – general schedule and agenda	Hold pre-trip meeting to confirm trip details. Obtain information regarding special needs of students (e.g., physical limitations, special dietary requirements). Discuss trip expectations.
	• describe and incorporate guidelines for environmental awareness into trip planning and preparations; e.g.: – principles of ecotourism – consideration for carrying capacity – strategies for minimum impact land use	List potential environmental impacts of the trip. Write before-and-after journal entries to document affect on a campsite.
	• identify and obtain appropriate supplies, equipment and personal gear for the trip; e.g.: – water, food and grub box – tents, stoves, ax – first aid and survival kits – clothing and foot wear – toiletries	Contact a local outdoor gear supplier for information and instruction on supplies and equipment. List all supplies/equipment to be taken on trip. Identify items that may have significant environmental impact—consider alternatives that would lesson impact.
	• plan for weather and seasonal conditions; e.g.: – identify hazards particular to the area – listen to weather and news reports and forecasts	Establish methods of regular and emergency communication, and a contingency plan to be used if regular communication is interrupted.

Concept	Specific Learner Expectations	Notes
	The student should:	
Trip Planning and Preparation (continued)	• conduct a pre-trip assessment of supplies, equipment and personal gear; e.g.: – compare to trip checklist – assess quality, quantity and condition – assess relative to weather and seasonal conditions – obtain missing and/or specialty items	Compare supplies with checklist. Ensure all equipment is in satisfactory working condition. Pack supplies/equipment in waterproof containers.
	• prepare supplies, equipment and personal gear for transportation	
	• plan courses of action to cope with potential emergency situations in the wilderness; e.g.: – extreme weather conditions – fire or flood – injury and illness – avalanche.	Potential linkages exist with the "First Aid in the Wilderness" certificate course (see Section H: Linkages/ Transitions). Outline requirements foi survival and first-aid kits.
Conducting and Concluding the Trip	• follow guidelines for safe travel in the forest; e.g.: – inform responsible person of travel plans – follow travel schedule as planned – use orientation and navigational skills – identify potential hazards and take necessary precautions – dress according to mode of travel, weather and season – watch for changes in current weather conditions	Students need a written plan so everyone knows who is responsible for each function. Become familiar with hazards particular to the area. Listen to news and weather reports. Carry survival equipment. Reroute, postpone or cancel trip if conditions threaten safety.
	• set up a wilderness campsite, following guidelines for comfort, safety and least possible environmental impact; e.g.: – select campsite considering • site exposure and drainage • access to water and firewood • impact on flora and fauna • proximity to potential dangers – erect tent or lean-to – assemble other amenities – protect food from wildlife and spoilage – protect equipment from the elements	Select dry, level ground. Consider potential hazards including fire, rock slides, avalanches, dead materials close to shelter, etc.

MODULE FOR2040: WOODS SURVIVAL 2 (WILDERNESS EXCURSION) (continued)

Concept	Specific Learner Expectations	Notes
	The student should:	
Conducting and Concluding the Trip (continued)	• identify minimal impact guidelines and establish: – latrine location and toilet procedures – wash area and procedures – fire site and use – methods of garbage and waste water disposal	Use biodegradable soap. Be aware of local fire restrictions. Use driftwood or deadfall whenever possible.
	• demonstrate compliance with local, provincial and federal legislation relevant to activities that are undertaken	Consider land use, permits, seasonal restrictions, quotas, etc. Seek clarification if necessary. Report violations.
	• perform outdoor camp duties on a rotational basis; e.g.: – meal preparation – camp maintenance and hygiene	Students should practise food preparation at home first. Have students participate in all areas of preparation, operation and clean-up. Alternate chores during trip.
	• demonstrate practical knowledge and skills in at least three areas relevant to wilderness travel; e.g.: – closed compass traverse – tree/shrub/vegetation/twig identification – animal track and scat identification – use of equipment – survival skills	
	• record the activities of wildlife in the area and take precautions to avoid dangerous situations	Dispose of garbage properly. Store food safely. Maintain safe distance.
	• demonstrate appropriate procedures to break camp; e.g.: – pack supplies, equipment and personal gear – take down shelter – clean site – do circle tour of site	Bury waste and remove all signs of toilet pit. Do circle tour of campsite—look for garbage and misplaced equipment.

Concept	Specific Learner Expectations	Notes
Conducting and Concluding the Trip (continued)	*The student should:* • conclude the wilderness trip and conduct a post-trip assessment; e.g.: – observations and personal impressions – problems encountered – recommendations regarding future trips.	Have students "bring back in image" of a favourite spot or something they considered special about the trip. Develop images through drawings or descriptive writings. Develop a slide/tape presentation based on the outdoor wilderness trip. Consider: • satisfaction with equipment and supplies • suitability of environment or route • inconsistencies between trip and expectations.

MODULE FOR2060: MEASURING THE FOREST 2 (SAMPLING TECHNIQUES)

Level: Intermediate

Theme: Technology and Applications

Prerequisite: FOR1060 Measuring the Forest 1 (Measurement Skills)
Emergency First Aid (current certification)

Module Description: Students research current forest inventory practices, and demonstrate appropriate strategies for sampling the fibre and nonfibre value of forests.

Support Module: CTR1210 Personal Safety (Management) [Career Transitions Strand]

Because of the practical nature of this module, students must have a general knowledge of basic first-aid and survival techniques relevant to forest environments. See Planning for Instruction in Section C for further information on student safety.

Module Parameters: Access to a demonstration forest and forest measurement tools.

Instructor training (current certification) in Standard Level First Aid is required.

See Section C (Planning for Instruction) and Section H (Linkages/Transitions) for further information on instructor training and certification.

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will: • describe random and systematic sampling techniques for gathering information about the forest resource	*Assessment of student achievement should be based on:* • completing a research project on random and systematic sampling techniques and their application in gathering data about fibre and nonfibre forest values. Research to address problems related to bias, error, and the use of sample data in estimating forest populations. *Assessment Tool* *Research Process: Random and Systematic Sampling Techniques, FOR2060–1* *Standard* *Complete all components of research to a standard of 2 on the rating scale*	20

BEST COPY AVAILABLE

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• gather sample data regarding fibre and nonfibre values in a forested region	• designing a sampling technique (transect and plot) for gathering information about a specific fibre and nonfibre resource (e.g., trees, rabbits, soil, grass, insects). Design to address: – goals/outcomes for the forest survey – type and amount of data to be collected – suitable sampling techniques – boundary for sample area – a data collection sheet. *Assessment Tool* *Task Checklist: Sampling Fibre and Nonfibre Forest Values, FOR2060–2* *Standard* *Design the sampling technique(as outlined in the task checklist) to a standard of 2 on the rating scale*	30
	• collecting and recording sample data on a representative forested area, and compiling sample data in order to estimate the fibre and nonfibre resource within the forested area. Fibre data sampling to involve transects and plots, and to be accurate within 10%. *Assessment Tool* *Task Checklist: Sampling Fibre and Nonfibre Forest Values, FOR2060–2* *Sample Data Sheet: Fibre and Nonfibre Forest Values, FOR2060–3* *Lab Assessment: Outdoor Forest Experiences, FORLAB* *Standard* *Collect, record and compile sample data (as outlined in the task checklist and lab assessment) to a standard of 2 on the rating scale*	40

MODULE FOR2060: MEASURING THE FOREST 2 (SAMPLING TECHNIQUE) (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
	• summarizing and assessing the strengths and weaknesses of the sample data and statements made about the forest resource. *Assessment Tool* *Task Checklist: Sampling Fibre and Nonfibre Forest Values, FOR2060–2* *Standard* *Summarize and assess survey results (as outlined in the task checklist) to a standard of 2 on the rating scale*	10
• demonstrate basic competencies.	• observations of individual effort and interpersonal interaction during the learning process. *Assessment Tool* *Basic Competencies Reference Guide and any assessment tools noted above*	Integrated throughout

Concept	Specific Learner Expectations	Notes
	The student should:	
Sample Designs	• describe different sampling designs and techniques: – random – systematic	Investigate applications of • transects • plots/nested plots • surveys and questionnaires.
	• describe sample designs and techniques most suited to gathering data about specific forest components	For example: • distribution of tree species • growth, age and/or volume of trees • soil, water and/or wildlife characteristics • potential for recreation and/or agriculture.
	• identify bias and error in sampling design, and problems related to the use of sample data in estimating forest populations.	

MODULE FOR2060: MEASURING THE FOREST 2 (SAMPLING TECHNIQUE) (continued)

Concept	Specific Learner Expectations	Notes
	The student should:	
Fibre and Nonfibre Values	• identify goals/outcomes for a forest survey	PLAN AND SHARE - LEARN FROM OTHERS.
	• identify the type and amount of information regarding the forest resource that is required	Develop, as a class project, a sampling design appropriate to surveying a specific forest resource. Use the sampling design to collect data.
	• design techniques for sampling the forest region that are most suited to gathering the type of information required	
	• calculate and locate the boundary of the sample area within the forest region	
	• identify safety practices and policies relevant to gathering sample data in the forest	
	• gather data regarding the volume and/or condition of timber resources within the sample plots	For example, • tree height/diameter • age of trees • number and distribution of species.
	• gather data regarding the nature of other nonfibre resources present within the sample plots	For example, • soil and water quality • distribution of wildlife • potential for recreation/agriculture.
	• record sample data regarding fibre and nonfibre resources in appropriate tables and charts	
	• compile sample data as required to estimate fibre volumes and other nonfibre values within the forest region	Make estimates regarding the forest population based on data collected.
	• assess the strengths and weaknesses of the sample data and statements made about the forest resource.	Discuss the validity/ reliability of results.

MODULE FOR2070: HARVEST PRACTICES (FIBRE HARVEST & PROCESSING)

Level: Intermediate

Theme: Technology and Applications

Prerequisite: None

Module Description: Students research the steps involved in harvesting and processing the forest fibre resource.

Module Parameters: Access to forest harvest areas and forest products industries.

Off-campus learning may support components of research related to forest harvest and fibre utilization; consultation with the work-site supervisor will ensure that relevant safety considerations are addressed.

See the *Off-Campus Education Guide for Administrators, Counsellors and Teachers* (Alberta Education, 1997) for further information regarding off-campus learning.

Supporting Module: CTR2210 Workplace Safety Practices [Career Transitions Strand]

Students must have a general knowledge of potential hazards and accepted safety practices relevant to forest harvest sites prior to engaging in off-campus learning experiences. See Planning for Instruction in Section C for further information regarding student safety.

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will: • identify major components of a plan for a forest harvest	*Assessment of student achievement should be based on:* • identifying major components of a plan for forest harvest, including: – when and how much to cut – methods of harvest (e.g., clearcutting, shelter wood method) and logging (e.g., hand, mechanical) – regeneration and environmental protection. *Assessment Tool* *Knowledge/Application Assessment: Forest Harvest, FOR2070–1* *Sample Checklist: Forest Harvest Plans, FOR2070–2* *Standard* *Respond to a standard of 2 on the rating scale*	15

MODULE FOR2070: HARVEST PRACTICES (FIBRE HARVEST & PROCESSING)
(continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
	• a teacher-prepared assessment in which the student demonstrates knowledge of major components and considerations relevant to harvest planning. *Assessment Tool* *Sample Assessment Items: Forest Harvest, FOR2070–3* *Standard* *Response indicating 65% mastery*	
• describe the mechanics of harvesting trees	• a presentation or report that describes major stages in the harvesting procedure from stump to mill. Presentation/report to address: – methods of falling, bucking, delimbing, skidding, loading, hauling, slash disposal and site rehabilitation – technologies (e.g., machines, processes) used in the harvesting procedure – safety considerations (e.g., legislation, equipment, procedures) relevant to the harvesting operation. *Assessment Tool* *Presentations/Reports: Intermediate Level, FORPRE–2* *Standard* *Achieve a minimum rating of 2 on the rating scale for Presentations/Reports*	50
• explain techniques used in fibre utilization and product formation	• completing a research project on fibre utilization and product formation. Research to address: – major categories/types of forest products – steps involved in converting a log into lumber, pulp and one other forest product – new developments in milling and pulping technology. *Assessment Tool* *Research Process: Fibre Utilization and Product Formation, FOR2070–4* *Standard* *Complete all components of research to a standard of 2 on the rating scale*	25

BEST COPY AVAILABLE

MODULE FOR2070: HARVEST PRACTICES (FIBRE HARVEST & PROCESSING)
(continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• describe career opportunities relevant to forest harvesting and fibre use	• given current information on career opportunities in forest harvest and fibre utilization, completing a research project on one or more occupations in related fields. *Assessment Tool* *Career Search: Intermediate Level, FORCAR–2* *Standard* *Conduct research to a standard of 2 on the rating scale*	10
• demonstrate basic competencies.	• observations of individual effort and interpersonal interaction during the learning process. *Assessment Tool* *Basic Competencies Reference Guide and any assessment tools noted above*	Integrated throughout

Concept	Specific Learner Expectations	Notes
	The student should:	
Harvest Plan	• identify major components of a plan for harvesting the forest: – when and how much to cut – method of harvest (e.g., clearcutting, shelter wood method) and logging (e.g., hand, mechanical) – regeneration and environmental protection • relate the concepts of allowable cut, sustained yield and multiple use to forest harvest practices	This module develops appropriate background knowledge for FOR2120 (Users in the Forest) and FOR3120 (Integrated Resource Management). Discuss essential components of a forest harvest plan—DO NOT make a plan. Use resource persons from government and industry if possible.

MODULE FOR2070: HARVEST PRACTICES (FIBRE HARVEST & PROCESSING)

(continued)

Concept	Specific Learner Expectations	Notes
Harvest Plan (continued)	*The student should:* • explain applications of forest inventory information in establishing a plan for harvest: – identification of tree species – determining timber quality, volume and age – layout of cutting area and landing sites – planning for forest access • describe applications of different methods of forest harvest: – clearcutting – selective cutting – shelter wood cutting • describe applications of different methods of forest regeneration: – natural – artificial • identify environmental concerns to be addressed through harvest plans: – protection of sensitive areas – impact on downstream values – landslide and erosion hazards.	Videos relevant to harvest planning and available from Alberta Pacific Forest Industries (telephone: 1–800–661–5210) include: • *A Pledge to the Future: The Alberta Pacific Story* (23 minutes) • *With Eyes on Tomorrow* (38 minutes). Identify considerations relevant to establishing the size and location of harvest tracts. Investigate road and landing requirements for a local harvest operation. Discuss the scheduling of equipment and completion dates for harvest operations.
Harvest Techniques	• identify stages in the harvesting procedure from stump to mill: – falling, bucking and delimbing – skidding – loading and hauling • describe techniques and equipment used to fell, buck and delimb trees in a forest harvest operation • describe techniques and equipment used to transport logs from stump to landing site in a forest harvest operation • describe techniques and equipment used to transport logs from landing site to mill in a forest harvest operation	Plan for off-campus learning activities that will enable students to follow the tree from harvest to finished product. Ask students to describe the processes used in felling, bucking and delimbing a tree. For example, • horses • mechanical skidders. Contact local forest industry /forest industry suppliers for guest speakers and print material.

MODULE FOR2070: HARVEST PRACTICES (FIBRE HARVEST & PROCESSING)
(continued)

Concept	Specific Learner Expectations	Notes
	The student should:	
Harvest Techniques (continued)	• describe techniques used in slash disposal and site rehabilitation following logging operations in a forest area	Arrange for students to work with a local landowner in reclaiming an eroded forest area.
	• identify safety legislation and requirements relevant to visiting a forest harvest site.	Identify safety precautions relevant to felling and transporting trees. Contact Occupational Health and Safety for: • *Logging Safety Manual* • *Chain Saw Safety Manual* • *Safety Log Transport Manual.*
Fibre Products	• identify major categories of forest products and give examples of each: – pulp and paper – lumber – veneer and plywood – board products – chemical and medicinal products	Visit a sawmill and pulp mill; prepare reports based on information gathered through visits.
	• describe the steps and processes involved in log utilization at a sawmill	Make a list of the major tasks performed at a sawmill.
	• describe the steps and processes involved in fibre utilization at a pulp mill: – mechanical – chemical.	Demonstrate and explain processes involved in producing a fibre product (e.g., paper). View ***Weyerhaeuser - OSB Production***, a 30-minute video distributed by Ranson Productions, Edmonton (telephone: 403–437–3400). Identify safety regulations pertinent to sawmill and pulp mill operations.

MODULE FOR2070: HARVEST PRACTICES (FIBRE HARVEST & PROCESSING)
(continued)

Concept	Specific Learner Expectations	Notes
	The student should:	
Career Opportunities	• describe potential careers in forest harvest and fibre utilization: – professional – technical – labour-based	Interview people employed in forest harvest and fibre utilization industries. Identify general areas of industry specialization.
	• describe employment statistics within one or more areas of specialization ; e.g.: – types of careers – number of workers – employment trends	Review National Occupational Profiles (NOC).
	• infer career opportunities and trends from employment statistics	Contact the "Career Hotline" (telephone 1–800–661–3753).
	• infer impacts of technology development and the marketplace on employment opportunities	
	• predict possible forest harvest and/or fibre utilization industries in the future, and resulting career opportunities.	Gather information from senior management people in the forest industry; also producers of value-added products.

MODULE FOR2100: FORESTS FOREVER 2 (MANAGEMENT PRACTICES)

Level: Intermediate

Theme: Management and Conservation

Prerequisite: FOR1100 Forests Forever 1 (Forest Use & Protection)

Module Description: Students explain Alberta's forest management goals, and describe the current management practices used to address these goals.

Module Parameters: Access government and industry organizations responsible for the sustainable management of forests (e.g., Alberta Environmental Protection, Canadian Forestry Service).

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• explain the goals of Alberta forest management	• developing a rationale for forest management in Alberta that involves: – identifying economic, environmental and social needs addressed through forest management – definitions and examples of sustainable development, sustained yield and allowable cut. *Assessment Tool* *Knowledge/Application Assessment: Forest Management Goals, FOR2100–1* *Standard* *Respond to a standard of 2 on the rating scale*	30
• identify different types of forest use and the views and values of different users in the forest	• analyzing current issues related to different types of forest use. Analysis to include: – a list of current uses/values of Alberta's forests – a summary of the views of different forest stakeholder groups – an explanation of potential conflicts among stakeholder groups – strategies for compromise and/or conflict resolution. *Assessment Tool* *Issue Analysis: Forest Use, FOR2100–2* *Standard* *Address criteria in issue analysis to a standard of 2 on the rating scale*	30

MODULE FOR2100: FORESTS FOREVER 2 (MANAGEMENT PRACTICES) (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• describe sustainable management practices within the context of Alberta's forested lands	• completing a research project on forest management practices in Alberta. Research to address: – definitions and examples of conservation and preservation – different philosophies regarding forest management and protection – the mandates of agencies responsible for managing Alberta's forested lands – the intent of different agreements, permits and/or licences that make Alberta's forests available for commercial or private use – factors likely to influence future forest management in Alberta. *Assessment Tool* *Research Process: Forest Management Practices, FOR2100–3* *Standard* *Complete all components of research to a standard of 2 on the rating scale*	40
• demonstrate basic competencies.	• observations of individual effort and interpersonal interaction during the learning process. *Assessment Tool* *Basic Competencies Reference Guide and any assessment tools noted above*	Integrated throughout

Concept	Specific Learner Expectations	Notes
	The student should:	
Forest Management Goals	• explain the goals of sustainable development within the context of Alberta's forests • relate the concept of sustained yield to a system of harvesting and reforestation • explain applications of "annual allowable cut" in forest management practices	Refer to *Our Growing Resource: Alberta's Forest Industry… Meeting Global Challenges* (available from the Alberta Forest Products Association).

MODULE FOR2100: FORESTS FOREVER 2 (MANAGEMENT PRACTICES) (continued)

Concept	Specific Learner Expectations	Notes
Forest Management Goals (continued)	*The student should:* • identify scientific, economic and social factors addressed through the management of forested lands in Alberta.	Possible factors to consider: • the silvics of trees growing in the area • a cycle for utilization and replacement • the goals of different stakeholder groups.
Forest Uses and Users	• compare current uses and values of Alberta's forests: – recreation and aesthetics – wildlife habitat – fibre production – range lands – coal and petroleum projects – hunting and trapping – water, air and soil quality – ecosystem maintenance – job creation	See *Alberta's Focus on Forests* (Activity 4.3–Forest Perspectives; Activity 5.1–Forest Values). Supplementary sources of information include: • *A Forest Journey – The Role of Wood in the Development of Civilization* (Harvard University Press) • *Canadian Forestry – The View Beyond the Trees* (Macmillan of Canada).
	• describe the views of different forest stakeholder groups and potential conflicts that may arise: – recreational – environmental – industrial • explain the need for consultation with other resource users and public involvement in forest management.	Encourage and facilitate activities that involve: • roleplaying • discussion • interviewing.
Forest Management Practices	• identify components of conservation and utilization in current forest management practices • describe the mandates of agencies responsible for managing Alberta's forested lands	Contact resource persons from relevant government and industry organizations. For example: • Alberta Forest Service • Fish and Wildlife • Public Lands • Land Information Services.

MODULE FOR2100: FORESTS FOREVER 2 (MANAGEMENT PRACTICES) (continued)

Concept	Specific Learner Expectations	Notes
Forest Management Practices (continued)	*The student should:* • describe current management practices that make Alberta's productive forests available to industry for commercial harvest: – forest management agreements – quota certificates – commercial timber permits – local timber permits	Plan for group research and presentations.
	• predict factors likely to influence future forest management practices.	Possible factors to consider include: • new knowledge and technology • increased public participation in decision making • population trends • recreation and tourism • natural resource extraction.

MODULE FOR2120: USERS IN THE FOREST

Level:	Intermediate
Theme:	Management and Conservation
Prerequisite:	None
Module Description:	Students identify different forest users, and explain the planning principles used to develop an integrated resource management plan.
Module Parameters:	Access to forest management plans available from government and industry organizations (e.g., Alberta Environmental Protection, Alberta Forest Products Association).

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• identify different uses of the forest and the needs of each forest user	• identifying four or more major categories of forest use (e.g., industry, recreation, tourism, environmental) and examples of forest users within each category. *Assessment Tool* *Knowledge/Application Assessment: Users in the Forest, FOR2120–1* *Standard* *Respond to a standard of 2 on the rating scale*	10
• explain principles of multiple and integrated land use	• completing a research project on the principles of multiple and integrated land use. Research to address: – definitions and Alberta examples of multiple and integrated land use – a comparison of multiple land use and integrated land use principles. *Assessment Tool* *Research Process: Multiple and Integrated Land Use, FOR2120–2* *Standard* *Complete all components of research to a standard of 2 on the rating scale*	30

MODULE FOR2120: USERS IN THE FOREST (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• describe a plan for integrated resource management	• a flow chart that outlines basic components of integrated resource management. Flow chart to provide an overview of processes used to: – establish planning teams – determine management goals and objectives – ensure public involvement in planning – obtain approval for the management plan. *Assessment Tool* *Assessment Criteria: Flow Charts, FORFLO* *Standard* *Complete flow chart to a standard of 2 on the rating scale* • negotiating and presenting a plan for the integrated use of a local forested area. Plan to address: – the needs of at least four different users – strategies for compromise among users. *Assessment Tools* Alberta's Focus on Forests *(Section 5.5: Integrated Resource Management* *Negotiation and Debate: Intermediate Level, FORNEG–2* *Standard* *Negotiate and present the plan to a standard of 2 on the rating scale*	60
• demonstrate basic competencies.	• observations of individual effort and interpersonal interaction during the learning process. *Assessment Tools* *Basic Competencies Reference Guide and any assessment tools noted above*	Integrated throughout

MODULE FOR2120: USERS IN THE FOREST (continued)

Concept	Specific Learner Expectations	Notes
Forest Uses	*The student should:* • identify and describe four or more major types of forest uses; e.g.: – industrial – recreational – wildlife habitat – water, air and soil quality • describe specific uses and multiple demands placed upon forested land; e.g.: – wood fibre production – wildlife management – grazing and range management – watershed – oil, gas and mining – recreation – protected areas • explain why forests can and should serve many purposes • describe examples of a variety of uses of Alberta's forests; e.g.: – using different parts of the forest for different purposes – using the same area of the forest to obtain more than one benefit.	Introduce the module by reviewing the social, economic and environmental significance of forests. Plan for collaborative group projects and activities.
Multiple and Integrated Land Use	• demonstrate how integrated land use involves using a common area of forested land for two or more purposes; e.g.: – wood fibre – range – wildlife – recreation – mining • describe examples of the integrated use of local forested lands • compare principles of integrated land use with principles of multiple use management • explain the goals of Integrated Resource Planning (IRP) in establishing policy and guidelines for managing forested land.	Contact a Land Use Officer (Land and Forest Services, Alberta Environmental Protection) for research materials. Support learning through the development of role-playing activities.

MODULE FOR2120: USERS IN THE FOREST (continued)

Concept	Specific Learner Expectations	Notes
Integrated Resource Management	*The student should:* • identify and describe the basic components of Integrated Resource Planning (IRP); e.g.: – establishing a planning team – setting goals and objectives – soliciting public involvement – obtaining approval for the plan • prepare a flow chart that outlines relationships among the components of Integrated Resource Planning (IRP) • research two or more forest management plans having different goals, and identify components of Integrated Resource Planning (IRP) that are present in each; e.g.: – forest protection – access management – harvest planning – range management – wildlife management • develop a plan for the integrated use of a local forested area; e.g.: – conduct research – generate alternatives – agree to a workable solution.	See *Alberta's Focus on Forests*: • Activity 5.1–Forest Perspectives • Activity 5.2–Decisions for Change • Activity 5.5–Integrated Resource Management.

MODULE CURRICULUM AND ASSESSMENT STANDARDS:
SECTION F: ADVANCED LEVEL

The following pages define the curriculum and assessment standards for the advanced level of Forestry.

Advanced level modules demand a higher level of expertise and help prepare students for entry into the workplace or a related post-secondary program.

Module FOR3010: Issues in Forestry F.3
Module FOR3060: Measuring the Forest 3 (Survey Applications) F.7
Module FOR3070: The Forest Marketplace F.11
Module FOR3080: Forest Technology Applications F.17
Module FOR3090: Forest Ecology 2 (Silvics & Succession) F.21
Module FOR3110: Silviculture (Growing the Forest) F.27
Module FOR3120: Integrated Resource Management (Balancing Needs) F.33

MODULE FOR3010: ISSUES IN FORESTRY

Level: Advanced

Theme: Social and Cultural Perspectives

Prerequisite: None

Module Description: Students analyze current local and global issues in forest management, and demonstrate individual and shared actions that foster environmental stewardship.

Module Parameters: Access to information available from government, industry and community organizations (e.g., special-interest groups) regarding current forestry issues.

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will: • describe alternatives and consequences associated with current issues in forest management	*Assessment of student achievement should be based on:* • for each of five current issues in forest management, identifying and explaining three or more: – immediate and/or long-term consequences – possible alternatives for dealing with the issue. Consequences and alternatives to address social, economic and environmental perspectives. *Assessment Tool* *Issues in Forestry: Analyzing Issues, FOR3010–1* *Assessment Framework: Issue Analysis, CTSISS* *Standard* *Analyze five issues to a standard of 3 on the rating scale* • a critique of one newspaper/magazine article or video documentary regarding an issue in forest management. Critique to address: – range of viewpoints/biases evident – validity/reliability of information presented – recommended course of action. *Assessment Tool* *Issues in Forestry, FOR3010–1* *Guide to Critiquing Media Information, FORMED* *Standard* *Critique one piece of media information to a standard of 3 on the rating scale*	30

MODULE FOR3010: ISSUES IN FORESTRY (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• **compare and contrast issues and trends involving Canada's forests with similar issues and trends in other parts of the world**	• completing a research project on an international forest issue. Research to provide: – an explanation of the issue, including the stakeholders involved and their respective points of view – positive and negative consequences for the forest resource and society – a comparison of the issue with a similar forest issue in Canada – suggested strategies/actions for dealing with the issue at local and global levels. *Assessment Tool* *Issues in Forestry, FOR3010–1* *Assessment Framework: Research Process, CTSRES* *Standard* *Complete all components of research to a standard of 3 on the rating scale*	30
• **demonstrate individual and shared actions that foster the sustainable management of forested regions**	• providing a summary of the goals and accomplishments of one environmental conservation group. *Assessment Tool* *Issues in Forestry, FOR3010–1* *Standard* *Summarize goals/accomplishments to a standard of 3 on the rating scale* • given a current issue in forest management: – negotiating and debating the issue while assuming the role of one or more stakeholder groups – through group consensus building, developing and presenting a shared agreement on a preferred course of action for dealing with the issue. *Assessment Tool* *Issues in Forestry, FOR3010–1* *Negotiation and Debate: Advanced Level, FORNEG–3* *Standard* *Negotiate and present and shared agreement to a standard of 3 on the rating scale*	40

MODULE FOR3010: ISSUES IN FORESTRY (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will: • demonstrate basic competencies.	*Assessment of student achievement should be based on:* • observations of individual effort and interpersonal interaction during the learning process. *Assessment Tools* *Basic Competencies Reference Guide and any assessment tools noted above*	Integrated throughout

Concept	Specific Learner Expectations	Notes
	The student should:	
Issues Involve Alternatives	• describe past and present trends in the consumptive and non-consumptive use of forests • analyze differing points of view regarding how and to what degree Canada's forests should be used	Gather appropriate resource materials prior to beginning the module.
	• identify positive and negative effects of forest industry development on people, industry and the environment	Discuss issues from a variety of perspectives (e.g., social, economic, environmental).
	• describe and assess the pros and cons of different forest harvesting practices; e.g.: – clearcutting – selective harvesting	Discuss different perspectives regarding how and to what degree Canada's forests should be used. Analyze pros and cons related to different forest harvest practices.
	• describe issues related to the expansion and management of Alberta's forest industry; e.g.: – access management – herbicide use in timber management – old-growth management – maintenance of biodiversity	
	• describe ways in which different forest stakeholders make use of the judicial, legislative and regulatory systems in working toward their objectives.	Identify issues regarding the expansion of forest management in Alberta.

MODULE FOR3010: ISSUES IN FORESTRY (continued)

Concept	Specific Learner Expectations	Notes
Global Issues and Trends	*The student should:* • compare issues involving Canada's forests with similar issues in other parts of the world; e.g.: – land use – expansion of the forest industry – forest renewal processes – management of old-growth forests – climate change and forest ecosystems – extensive versus intensive management • describe global impacts of the recreational and commercial use of forests; e.g.: – social and cultural – economic – environmental • infer the long-range effects of the sustainable use of forests in Canada and other parts of the world.	Research a forest issue of significance in another country. Compare and contrast with the Canadian situation.
Individual and Shared Actions	• compare and contrast different philosophies, ethics and alternatives regarding the forest resource and how best to ensure its health and sustainability • describe the goals and objectives of one or more forest conservation or preservation groups • explain a global issue regarding the consumptive and/or non-consumptive use of forests; e.g.: – conduct research – develop a position – participate in debate • identify a plan for the use of a forested region; e.g.: – conduct research – generate alternatives – agree to a plan that meets an acceptable level of needs	See *Alberta's Focus on Forests*: • Activity 3.6–An Urban Wilderness at School • Activity 5.1–Forest Values • Activity 5.3–Forest Perspectives.
	• initiate responsible and ethical actions in relation to the forest and its many resources; e.g.: – individual actions – shared actions – leadership roles.	Plan learning activities - that emphasize and develop strategies for empowerment.

MODULE FOR3060: MEASURING THE FOREST 3 (SURVEY APPLICATIONS)

Level:	Advanced
Theme:	Technology and Applications
Prerequisite:	FOR2060 Measuring the Forest 2 (Sampling Techniques)
Module Description:	Students explain management applications of data collected from a forest survey, and examine the role of technology in current forest inventory practices.
Module Parameters:	Access to forest inventory technology and forest survey data available from government and industry organizations (e.g., Alberta Environmental Protection, Canadian Forestry Service, Canadian Centre for Remote Sensing). Access to forestry maps available from private vendors. Instructor knowledge of population sampling and survey design and/or relevant industry experience is an asset.

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will: • explain the applications of forest survey data in resource management	*Assessment of student achievement should be based on:* • identifying and explaining applications of timber cruise data and nonfibre data in resource management. *Assessment Tool* *Knowledge/Application Assessment: Forest Survey Data, FOR3060–1* *Standard* *Respond to a standard of 3 on the rating scale* • demonstrating applications of a sample set of forest survey data by: – identifying bias, error and other limitations in the sample data – extrapolating the data to estimate forest populations – using the survey data to establish effective forest management practices – modifying the sample design to increase accuracy of the survey. *Assessment Tool* *Knowledge/Application Assessment: Forest Survey Data, FOR3060–1* *Standard* *Respond to a standard of 3 on the rating scale*	60

MODULE FOR3060: MEASURING THE FOREST 3 (SURVEY APPLICATIONS) (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of studer : achievement should be based on:*	
• describe the role of technology in current forest inventory practices	• completing a research project on applications of technology in data collection, manipulation and/or storage. Research to address: – aerial photography – satellite imagery – computer-based mapping systems – applications of ground truthing in verifying data gathered through remote sensing. *Assessment Tool* *Research Process: Role of Technology in Forest Inventory, FOR3060–2* *Standard* *Complete all components of research to a standard of 3 on the rating scale*	30
	• given information regarding a current forest inventory research project (e.g., an Alberta Research Council project, an initiative of the Canadian Forestry Service), a presentation or report that summarizes: – the research problem/question – research design and expected results – accomplishments and challenges encountered to date – immediate and long-range implications of the research project. *Assessment Tool* *Presentations/Reports: Advanced Level, FORPRE–3* *Standard* *Complete the presentation or report to a standard of 3 on the rating scale*	
• explain career opportunities relevant to forest measurement	• given current information on career opportunities in forest measurement (e.g., labourer, technician, professional worker), completing a research project on one or more related careers. *Assessment Tool* *Career Search: Advanced Level, FORCAR–3* *Standard* *Conduct research to a standard of 3 on the rating scale*	10

MODULE FOR3060: MEASURING THE FOREST 3 (SURVEY APPLICATIONS) (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will: • demonstrate basic competencies.	*Assessment of student achievement should be based on:* • observations of individual effort and interpersonal interaction during the learning process. *Assessment Tools* *Basic Competencies Reference Guide and any assessment tools noted above*	Integrated throughout

Concept	Specific Learner Expectations	Notes
	The student should:	
Data Interpretation	• explain applications of timber cruise data in resource management; e.g.: – estimating total fibre volume – projecting future forest growth – planning harvest operations	Contact resource persons from: • Canadian Forestry Service (Natural Resources Canada) • Land and Forest Services (Alberta Environmental Protection). Perform mathematical calculations to determine timber volumes.
	• explain applications of nonfibre data in resource management; e.g.: – monitoring water and soil quality – determining potential for agriculture/ recreation – monitoring wildlife population densities and trends – planning conservation practices	Obtain sample data from local government/ industry. Use paper and pencil OR computer programs to interpret data.
	• interpret a set of sample forest survey data; e.g.: – consider bias, error and other limitations in the sample data – extrapolate the data to estimate forest populations – suggest applications of data in resource management – consider modification to sample design that may increase accuracy of the survey.	Supplementary sources of information on forest measurement include: • *Natural Resources Measurements* by Thomas Avery (McGraw Hill Book Co., 1975) • *Forest Mensuration* (3rd Edition) by Bertram Husch, Charles Miller and Thomas Beers (John Wiley and Sons Inc., 1982).

MODULE FOR3060: MEASURING THE FOREST 3 (SURVEY APPLICATIONS) (continued)

Concept	Specific Learner Expectations	Notes
	The student should:	
Role of Technology	• describe applications of technology in gathering and storing data about the forest resource; e.g.: – aerial photography – satellite imagery – computer-based mapping systems	Acquaint students with current applications of technology through field studies. Contact the following agencies for information on current information-gathering technologies: • *Canadian Centre for Remote Sensing* (Ottawa, Ontario) • *RADARSAT International* (Richmond, B.C.).
	• explain the importance of ground truthing in verifying data gathered through remote sensing • predict forest inventory technologies and practices in the future	Research the future use of computers and recent developments in Geographic Information Systems (GIS).
	• outline the objectives of a current forest inventory research project; e.g.: – an initiative of the Canadian Forestry Service – an Alberta Research Council project.	Investigate potential applications of Global Positioning Systems (GPS).
Career Opportunities	• outline potential careers and the range of occupational opportunities in forest measurement • summarize and present the results of research on one or more career opportunities in forest measurement; e.g.: – nature of the work – number of workers/employment trends – entry requirements/competencies – education/training opportunities – opportunity for advancement.	Review National Occupational Profiles (NOC). Interview persons involved in conducting forest inventories. Provide opportunities for work experience and job shadowing.

MODULE FOR3070: THE FOREST MARKETPLACE

Level: Advanced

Theme: Technology and Applications

Prerequisite: None

Module Description: Students describe the range of consumer products and services derived from Canada's forests, and research the production and marketing of these forest products.

Module Parameters: Access to resources available from forest products and forest service industries.

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• **describe fibre and nonfibre products and services derived from Canada's forests**	• given a range of relevant in-school/community resources, identifying and describing: – fibre and nonfibre products and services derived from Alberta's forests – forecasts regarding the future use of forests in Alberta and Canada. *Assessment Tool* *Knowledge/Application Assessment: Forest Products and Services, FOR3070–1* *Standard* *Respond to a standard of 3 on the rating scale*	10
• **explain processes used in developing fibre and nonfibre forest products and services in Canada and Alberta**	• preparing flow charts that depict the sequence of steps involved in developing three forest products and/or services. *Assessment Tool* *Assessment Criteria: Flow Charts, FORFLO* *Standard* *Complete flow charts to a standard of 3 on the rating scale* • completing a research project on recent applications of milling and/or pulping technology in the development of one or more forest products/services. *Assessment Tool* *Research Process: Milling and/or Pulping Technology, FOR3070–2* *Standard* *Complete all components of research to a standard of 3 on the rating scale*	30

BEST COPY AVAILABLE

MODULE FOR3070: THE FOREST MARKETPLACE (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• **identify market trends, and develop a marketing plan for a forest product or service**	• developing and presenting a multimedia marketing plan for a new forest product or service. Plan to involve consideration of: – factors that influence market trends – product diversification and/or specialization – potential markets in North America, the Pacific Rim, Europe and two other selected regions – materials and processes involved in product/service development – effective marketing strategies and systems. *Assessment Tool* *Assessment Criteria: A Marketing Plan, FOR3070–3* *Standard* *Develop and present the marketing plan to a standard of 3 on the rating scale*	50
• **explain career opportunities relevant to developing and marketing forest products**	• given current information on career opportunities in developing and marketing forest products (e.g., labourer, technician, professional worker), completing a research project on one or more related careers. *Assessment Tool* *Career Search: Advanced Level, FORCAR–3* *Standard* *Conduct research to a standard of 3 on the rating scale*	10
• **demonstrate basic competencies.**	• observations of individual effort and interpersonal interaction during the learning process. *Assessment Tools* *Basic Competencies Reference Guide and any assessment tools noted above*	Integrated throughout

MODULE FOR3070: THE FOREST MARKETPLACE (continued)

Concept	Specific Learner Expectations	Notes
Products and Services	*The student should:* • identify market-based products and services derived from Alberta's forests; e.g.: – primary wood products – wood-fabricated materials – wood pulp and paper products – chemical products – trapping, fishing and hunting – guiding and outfitting – tourism and recreational pursuits • identify psychological benefits and extra-market values derived from Alberta's forests; e.g.: – ecological values – aesthetic and spiritual values – bequest value for future generations • describe trends in the consumptive and non-consumptive use of forests in Canada and Alberta; e.g.: – recreation – trapping – logging – oil and gas development.	Contact the Alberta Forest Products Association for current resources and information. See *Alberta's Focus on Forests* (Activity 4.2–Products From Canada's Forests). Identify major industries that require wood. Identify common products derived from a selected tree species. Identify a range of forest products and services that could be derived from a selected site. Supplementary sources of information include: • *A Forest Journey - The Role of Wood in the Development of Civilization* (Harvard University Press) • *Canadian Forestry - The View Beyond the Trees* (Macmillan of Canada).
Processing	• identify and sequence the steps that are involved in producing a fibre commodity; e.g.: – harvest and transportation – processing techniques – grading, packing and storage • identify materials and services that are required at each stage in the production of a fibre commodity; e.g.: – human and natural resources – energy and technologies – inspection and regulation	See *Alberta's Focus on Forests*: • Activity 4.4–From Pulp to Paper and Back Again • Activity 4.5–Pulp and Paper: The Technology–Environment Connection. Draw posters that depict the journey of a tree from stump to consumer.

Concept	Specific Learner Expectations	Notes
Processing (continued)	*The student should:* • describe recent developments in milling and pulping technology and their impact on the forest industry; e.g.: – fibre utilization – environmental stewardship • identify new and emerging products and services derived from Alberta's forests; e.g.: – cattle food – methane gas.	
Marketing Systems and Trends	• describe the nature and extent of Canada's market share in North America, the Pacific Rim, Europe and other locations • describe systems used to market Canada's forest products and services at local, national and international levels	Marketing modules in the Agriculture strand and Management and Marketing strand offer additional instructional strategies.
	• identify social, economic and environmental factors that influence consumer trends and market demands for forest products and services • describe the impact of developing technologies on Canada's fibre and nonfibre forest products; e.g.: – efficiency of production processes – improved utilization – focus on value-added and knowledge intensive commodities	View *Dr. Suess: The Lorax*, a video that addresses environmental issues in marketing (available from the National Film Board or your local Urban/Regional Resource Centre).
	• identify market opportunities that arise from product diversification and specialization, international trade and participation in a global economy	Visit a sawmill and wood-product distributor to examine traditional and new uses of wood.
	• create a plan for identifying new market opportunities, developing a forest product, and managing the venture.	Prepare a venture plan for Christmas tree production and marketing.

MODULE FOR3070: THE FOREST MARKETPLACE (continued)

Concept	Specific Learner Expectations	Notes
Career Opportunities	*The student should:* • outline potential careers and the range of occupational opportunities in developing and marketing forest products • present the results of research on one or more careers involving the production and/or marketing of forest products; e.g.: – nature of the work – number of workers/employment trends – entry requirements/competencies – education/training opportunities – opportunity for advancement.	Review National Occupational Profiles (NOC). Interview persons involved in the production and marketing of forest products. Provide opportunities for work experience and job shadowing.

MODULE FOR3080: FOREST TECHNOLOGY APPLICATIONS

Level: Advanced

Theme: Technology and Applications

Prerequisite: None

Module Description: Students examine research and technological applications in the forest industry, and examine changing career opportunities in the forestry sector.

Module Parameters: Access to resources available from relevant industry and government organizations (e.g., Alberta Environmental Protection, Canadian Forestry Service, Alberta Research Council).

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will: • **describe different areas of forest research presently being conducted in Canada and Alberta**	*Assessment of student achievement should be based on:* • identifying major areas of forest research being conducted in Canada and, where possible, Alberta. *Assessment Tool* *Forest Technology Applications, FOR3080–1* *Standard* *Identify six major areas of forest research to a standard of 3 on the rating scale* • given information regarding a current forest research project in Canada (e.g., enhanced utilization, forest management), summarizing: – research objectives and participating agencies – information-gathering strategies – project status and implications for forest industry. *Assessment Tool* *Forest Technology Applications, FOR3080–1* *Presentations/Reports, FORPRE–3* *Standard* *Summarize one current forest research project to a standard of 3 on the rating scale*	30

BEST COPY AVAILABLE

MODULE FOR3080: FOREST TECHNOLOGY APPLICATIONS (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• **cite examples of current and emerging technologies used in the forest industry**	• completing a research project on three technologies and their application in different sectors of the forest industry (e.g., greenhouse/nursery operations, silviculture, forest harvest, wood production/utilization, forest inventory/protection). For each technology, research to address: – specific problems/needs being addressed – basic components and principles of operation – advantages/disadvantages with respect to social, economic and environmental factors. *Assessment Tool* *Forest Technology Applications, FOR3080–1* *Sample Research Topics: Technology Application, FOR3080–2* *Research Process, CTSRES* *Standard* *Complete research on three technologies to a standard of 3 on the rating scale*	50
• **explain career opportunities and trends relevant to the forestry sector**	• given current information on career opportunities and trends in the forestry sector, completing a research project on one or more related career clusters. *Assessment Tool* *Forest Technology Applications, FOR3080–1* *Career Search: Advanced Level, FORCAR–3* *Standard* *Complete research to a standard of 3 on the rating scale*	20
• **demonstrate basic competencies.**	• observations of individual effort and interpersonal interaction during the learning process. *Assessment Tool* *Basic Competencies Reference Guide and any assessment tools noted above*	Integrated throughout

MODULE FOR3080: FOREST TECHNOLOGY APPLICATIONS (continued)

Concept	Specific Learner Expectations	Notes
Research	*The student should:* • identify and describe different areas of forest research being conducted in Canada and Alberta; e.g.: – silviculture – harvesting systems – forest products – forest protection – wildlife inventories – ecological studies – integrated resource management • compare the goals and priorities of local agencies whose mandate is to conduct research related to forestry and forest ecosystems; e.g.: – individuals – corporations – colleges and universities – government agencies • explain the role of the Alberta Forest Research Advisory Council in coordinating forest research activities in Alberta • describe applications of data banks and information systems in making forest management decisions • identify major components of a research plan for the enhanced utilization and/or management of forests; e.g.: – goals and objectives of the plan – economic, political, scientific and related factors – methodologies and strategies – outcomes and types/kinds of data obtained – limitations of the plan, or information that may be lacking or incomplete.	Contact the Canadian Forestry Service (Natural Resources Canada) for current information (see Section I: Learning Resource Guide).
Technologies	• describe past and present applications of technology in the forest industry; e.g.: – greenhouse and nursery operations – silviculture – harvesting technologies – wood production and utilization – biotechnology	

Concept	Specific Learner Expectations	Notes
Technologies (continued)	*The student should:* • describe emerging applications of technology in the forest industry; e.g.: – pulping procedures – effluent treatment and pollution control • describe the advantages and disadvantages of a recent technology designed to enhance our utilization and/or management of forests; e.g.: – social – economic – environmental.	
Career Trends	• predict ways in which research, technology, social values and land use priorities may affect forest industries in the future • predict future careers and occupational opportunities within the forestry sector, and the education/training that may be required to gain employment and advance in related fields	
	• describe general career areas and the range of occupational opportunities available within each; e.g.: – forest inventory – forest biology/ecology – forest protection – forest harvest – forest products industry – forest management	Review National Occupational Profiles (NOC).
	• describe one or more employment opportunities in forestry; e.g.: – job description/working conditions – entry requirements/competencies – educational/training opportunities – opportunity for advancement – opportunity for self-employment and entrepreneurship.	Contact the "Career Hotline" (telephone 1-800-661-3753). Interview persons employed in the forestry sector.

MODULE FOR3090: FOREST ECOLOGY 2 (SILVICS & SUCCESSION)

Level: Advanced

Theme: Management and Conservation

Prerequisites: FOR1090 Forest Ecology 1 (Ecosystem Dynamics) or Biology 20
Emergency First Aid (current certification)

Module Description: Students investigate the interrelationships among soil, water, air, trees and the environment, and explain how forests change over time as a result of these interrelationships.

Module Parameters: Access to a forest environment.

Instructor training (current certification) in Standard Level First Aid is required.

See Section C (Planning for Instruction) and Section H (Linkages/Transitions) for further information on instructor training and certification.

Supporting Modules: AGR2120 and AGR3120 Soils Management 1 and 2

Students must have a general knowledge of basic first aid and survival techniques relevant to a forest environment prior to engaging in field-based investigations. See Planning for Instruction in Section C for further information on student safety.

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will: • **explain the effects of soil, air and water characteristics on forest ecosystems**	*Assessment of student achievement should be based on:* • identifying and describing: – organic and inorganic components of forest soils and their function in forest ecosystems – major types of air pollutants and their affect on forest ecosystems. *Assessment Tool* *Knowledge/Application Assessment: Soil, Air and Water Characteristics, FOR3090–1* *Standard* *Respond to a standard of 3 on the rating scale*	40

BEST COPY AVAILABLE

MODULE FOR3090: FOREST ECOLOGY 2 (SILVICS & SUCCESSION) (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
•	• conducting field investigations on the effects of soil pH, temperature and water quantity on plant growth. *Assessment Tool* *Field Investigations: Soil, Air and Water Characteristics, FOR3090–2* *Standard* *Conduct field investigation to a standard of 3 on the rating scale*	
	• describing causal relationships and making inferences regarding the effects of: – local forests on soil, water, weather and biotic factors – global forests on global climate. *Assessment Tool* *Guide to Inferences: Forest Ecosystems, FOR3090–3* *Standard* *Make ten inferences (as outlined in FOR309–3) to a standard of 3 on the rating scale*	
• identify factors that determine the presence of tree species and forest ecosystems in particular environments	• completing a field-based research project on forest associations. Research to include: – the silvics of five common Alberta tree species, including climatic, soil and moisture requirements – the structural characteristics and environments of three common Alberta forest associations, and factors that have determined their existence. *Assessment Tools* *Research Process: Forest Associations, FOR3090-4* Alberta's Focus on Forests *(Section 3.1: A Lot Depends on Location)* *Common Forest Associations in Alberta, FOR3090-5* *Standard* *Complete all components of research to a standard of 3 on the rating scale*	30

MODULE FOR3090: FOREST ECOLOGY 2 (SILVICS & SUCCESSION) (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• explain the process of change in a forest environment	• given access to a local forest environment, identifying on-site: – four living agents of change – four nonliving agents of change – two examples of succession. *Assessment Tool* Alberta's Focus on Forests *(Section 1.6: Change in Forest Ecosystems)* *Identification Guide: Agents of Change, FOR3090-6* *Standard* *Address all criteria in the identification guide to a standard of 3 on the rating scale*	30
	• making inferences regarding structural and/or behavioural adaptations of living organisms to particular changes in a forest environment. *Assessment Tool* *Guide to Inferences: Forest Ecosystems, FOR3090–3* *Standard* *Make four inferences (as outlined in FOR3090–3) to a standard of 3 on the rating scale*	
• demonstrate basic competencies.	• observations of individual effort and interpersonal interaction during the learning process. *Assessment Tools* *Basic Competencies Reference Guide and any assessment tools noted above*	Integrated throughout

BEST COPY AVAILABLE

Concept	Specific Learner Expectations	Notes
	The student should:	
Forest Ecosystems	• describe physical characteristics used to classify forest soils, and the effect of different soils on plant growth; e.g.: – texture – porosity	See *Alberta's Focus on Forests*: • Activity 1.4–How Forests Affect the Environment • Activity 1.5–Biosphere.
	• explain the function of organic and inorganic components of forest soils; e.g.: – micro- and macro-organisms – gases and minerals – organic matter – water	Investigate soil characteristics by digging a soil pit.
	• describe the effects of soil acidity, alkalinity and temperature on the growth of trees and other forest plants	Analyze soil samples using a soil test kit.
	• describe indicators of water quantity in the forest, and its effects on trees and other plants; e.g.: – surface water – ground water	Design and perform experiments that monitor the effects of soil composition, air quality and water quality on tree growth.
	• describe the effects of known air pollutants on forest ecosystems; e.g.: – ozone – particulate matter – oxides and nitrogen – sulphur dioxide	For additional information, obtain *Diagnosis of Air Pollutant and Natural Stress Symptoms on Forest Vegetation in Western Canada* (available at no cost from the Canadian Forestry Service, Natural Resources Canada).
	• describe the effects of a forest on the local environment; e.g.: – soil and water – weather – wildlife	Measure/infer rates of transpiration and subsequent effect on weather and wildlife.
	• infer the effects of forests worldwide on global climates.	

MODULE FOR3090: FOREST ECOLOGY 2 (SILVICS & SUCCESSION) (continued)

Concept	Specific Learner Expectations	Notes
	The student should:	
Forest Associations	• explain how each tree species has unique site and climatic requirements that determine its ability to grow in particular environments	Conduct field trips to classify growth sites.
	• describe the general characteristics, life history, site and climatic requirements of five Alberta tree species; e.g.: – tree form – growth patterns and life cycle – soil – moisture – aspect and elevation	See *Alberta's Focus on Forests*: • Activity 2.4–Differences in Design • Activity 3.1–A Lot Depends on Location..
	• describe the general structural characteristics and environments of some common forest associations in Alberta; e.g.: – soil – moisture – position on slope.	Discuss the "most likely site" to find a particular tree species.
Forest Change	• identify living and nonliving agents of change in a local forest environment	See *Alberta's Focus on Forests*: • Activity 1.6–Change in Forest Ecosystems • Activity 3.5–Controlling Fire
	• infer structural and/or behavioural adaptations of living organisms to particular changes in the forest environment; e.g.: – adaptations to site conditions – reproductive adaptations	
	• describe the impacts of specific environmental changes on a forest community; e.g.: – short-term consequences – long-term consequences	Relate to forest associations.
	• give examples of primary and secondary successional stages in a local forest environment	Example: aspen/spruce understorey.
	• describe Alberta's natural forest history; e.g.: – role of fire – role of other agents.	Visit a mature forest and clearcut area. Compare and contrast the two areas and make predictions for each forest environment in five years.

MODULE FOR3110: SILVICULTURE (GROWING THE FOREST)

Level: Advanced

Theme: Management and Conservation

Prerequisite: None

Module Description: Students demonstrate knowledge of the techniques used to establish, grow and harvest tree crops.

Module Parameters: Access to a demonstration forest.

Off-campus learning may support the development of knowledge and skills in stand establishment and tending practices; consultation with the work-site supervisor will ensure that relevant safety considerations are addressed.

See the *Off-Campus Education Guide for Administrators, Counsellors and Teachers* (Alberta Education, 1997) for further information regarding off-campus learning.

Supporting Module: CTR2210 Workplace Safety (Practices) [Career Transitions Strand]

Students must have a general knowledge of potential hazards and accepted safety practices relevant to stand management prior to engaging in off-campus learning experiences. See Planning for Instruction in Section C for further information on student safety.

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will: • describe silviculture and the silvics of Alberta tree species	*Assessment of student achievement should be based on:* • identifying and describing: – major components of silviculture, including stand establishment, stand management and harvest – the silvics of five Alberta tree species. *Assessment Tool* *Knowledge/Application Assessment: Silviculture, FOR3110–1* *Sample Format: Silvics of a Tree Species, FOR3110–2* *Standard* *Respond to a standard of 3 on the rating scale*	20

MODULE FOR3110: SILVICULTURE (GROWING THE FOREST) (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will: • demonstrate practices used to establish a stand of trees and manipulate growing conditions to favour particular species	*Assessment of student achievement should be based on:* • conducting laboratory and/or field-based investigations that demonstrate regeneration by: – natural methods, including natural seed supply and vegetative reproduction – artificial methods, including direct seeding, bare-root and container seedlings. *Assessment Tool* *Lab Investigations: Natural and Artificial Regeneration, FOR3110–3* *Observation Checklist for Field-based Investigations, FOROBS* *Standard* *Conduct lab investigations to a standard of 3 on the rating scale and/or complete all sections of the observation checklist for field-based investigations* • a teacher-prepared assessment in which the student demonstrates knowledge of practices used to establish and manage a stand of trees. *Assessment Tool* *Sample Assessment Items: Stand Establishment and Management, FOR3110–4* *Standard* *Response indicating 80% mastery*	60

MODULE FOR3110: SILVICULTURE (GROWING THE FOREST) (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
	• demonstrating (or explaining) practical field techniques used to establish and tend a stand of trees. Tasks to include: – site preparation – cone collection and seed extraction – planting stock – spacing, thinning, pruning, fertilizer use. *Assessment Tool* *Task Checklist: Stand Establishment and Tending, FOR3110–5* *Lab Assessment: Outdoor Forest Experiences, FORLAB* *Observation Checklist for Field-based Investigations, FOROBS* *Standard* *Achieve a performance rating of :* *– 2 in areas identified on the task checklist* *– 3 in applicable areas of lab assessment.* *Complete all sections of the observation checklist for field-based investigations*	
• **describe and compare methods of harvesting tree species**	• given access to current publications on harvest methods (e.g., clearcutting, seed tree, shelterwood, selection), completing a research project on: – the benefits and costs of different methods of harvest – appropriate methods of harvest (as determined by silvics) for each of seven Alberta tree species. *Assessment Tool* *Research Process: Forest Harvest Methods, FOR3110–6* *Standard* *Complete all components of research to a standard of 3 on the rating scale*	10
• **explain career opportunities relevant to silviculture**	• given current information on career opportunities in silviculture (e.g., labourer, technician, professional worker), completing a research project on one or more related careers. *Assessment Tool* *Career Search: Advanced Level, FORCAR–3* *Standard* *Conduct research to a standard of 3 on the rating scale*	10

BEST COPY AVAILABLE

MODULE FOR3110: SILVICULTURE (GROWING THE FOREST) (continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will: • **demonstrate basic competencies.**	*Assessment of student achievement should be based on:* • observations of individual effort and interpersonal interaction during the learning process. *Assessment Tool* *Basic Competencies Reference Guide and any assessment tools noted above.*	Integrated throughout

Concept	Specific Learner Expectations	Notes
Silviculture and Silvics	*The student should:* • define silviculture • identify major components of silvicultural systems; e.g.: – stand establishment – stand management – harvest and re-establishment • explain how individual tree species have unique ecological requirements that determine suitable silvicultural practices • compare and contrast the ecological requirements and silvics for two or more Alberta tree species • describe one or more research programs designed to improve silvicultural practices; e.g.: – genetic selection – geographic information systems – harvesting operations.	Discuss silviculture as the science and art of growing and tending forest crops to obtain more and better benefits from forests including wood. Invite a professional forester to explain components of silviculture.

MODULE FOR3110: SILVICULTURE (GROWING THE FOREST) (continued)

Concept	Specific Learner Expectations	Notes
	The student should:	
Regeneration and Stand Treatment	• demonstrate methods of regeneration where seedlings are established by natural methods; e.g.: – naturally supplied seeds – vegetative reproduction	Contact Land and Forest Services (Alberta Environmental Protection) prior to module delivery for information regarding: • seedling availability • tour sites • equipment availability.
	• demonstrate methods of regeneration where seedlings are established by artificial methods; e.g.: – planting bare-root and container seedlings – broadcasting seeds	See *Alberta's Focus on Forests* (Activity 5.4–Reforestation: Forests or Tree Farms).
	• compare natural methods of regeneration with artificial methods • demonstrate techniques for site preparation and the care and planting of seeds and seedlings	Plan for practical field experiences in establishing a stand of trees and manipulating growing conditions to favour particular species.
	• demonstrate intermediate stand tending techniques; e.g.: – cleaning – thinning – pruning – fertilizing – protecting	Opportunities may also exist for practical field experiences in seed collection and tree planting. Consider linking silviculture activities with school fundraising initiatives.
	• identify safety practices and policies relevant to site preparation, tree planting and stand tending	Grow container plants and apply different levels of fertilization.
	• distinguish between intensive and extensive stand management practices.	Compare the nutrient requirements of young and mature stands.

MODULE FOR3110: SILVICULTURE (GROWING THE FOREST) (continued)

Concept	Specific Learner Expectations	Notes
	The student should:	
Cutting Methods	• identify factors important in choosing a suitable method of harvest; e.g.: – growth characteristics – intended utilization – regeneration of species	See *Alberta's Focus on Forests* (Activity 4.6– Cutting Styles).
	• describe current applications of different methods of harvesting trees; e.g.: – clearcutting method – seed tree method – shelterwood method – selection method	For additional information, obtain *Timber Harvesting Guidelines* (available from Land and Forest Services, Alberta Environmental Protection).
	• compare different methods of harvesting trees • relate appropriate harvest methods to individual tree species.	Select three or more sites that exhibit different timber characteristics. Examine each site to determine timber condition and relevant harvest considerations.
Career Opportunities	• outline potential careers and the range of occupational opportunities in silviculture: – professional – technical – labour-based	Review National Occupational Profiles (NOC). Interview persons involved in silviculture practices.
	• present the results of research on one or more employment opportunities in silviculture; e.g.: – nature of the work – number of workers/employment trends – entry requirements/competencies – education/training opportunities – opportunity for advancement.	Provide opportunities for work experience and job shadowing.

MODULE FOR3120: INTEGRATED RESOURCE MANAGEMENT (BALANCING NEEDS)

Level: Advanced

Theme: Management and Conservation

Prerequisite: FOR2120 Users in the Forest

Module Description: Students develop and present an integrated plan for sustainable development of the forest resource.

Module Parameters: Access to government, industry and community organizations responsible for sustainable forest management and environmental stewardship (e.g., Alberta Environmental Protection, Alberta Forest Products Association, special-interest groups).

Note: This is a summative module that requires prior knowledge of the principles of sustainable management. It should be the last module studied in a series of Forestry modules.

Curriculum and Assessment Standards

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will: • **describe basic forest management principles**	*Assessment of student achievement should be based on:* • definitions and Alberta examples of sustainable development, sustained yield, integrated land use and multiple use management. *Assessment Tool* *Knowledge/Application Assessment: Forest Management Principles, FOR3120–1* *Standard* *Respond to a standard of 3 on the rating scale*	10

MODULE FOR3120: INTEGRATED RESOURCE MANAGEMENT (BALANCING NEEDS)
(continued)

Module Learner Expectations	Assessment Criteria and Conditions	Suggested Emphasis
The student will:	*Assessment of student achievement should be based on:*	
• **develop a plan for sustainable development and integrated use of forested land**	• developing and presenting a plan for the sustainable development and integrated use of a forested region. Plan to address: – short- and long-term goals and objectives – the views of relevant stakeholder groups – a process for public involvement – proposed management standards and guidelines – a schedule of development activities – forest boundaries, access, physical features, cover and other resources – permits, licences and/or other legal agreements that may be required – a strategy for monitoring use and resolving potential conflicts. *Assessment Tools* *Assessment Criteria: Developing a Forest Management Plan, FOR3120–2* *Presentations/Reports: Advanced Level, FORPRE–3* *Standard* *Achieve a minimum performance rating of:* *– 2 in developing the management plan* *– 3 in presenting the management plan*	90
• **demonstrate basic competencies.**	• observations of individual effort and interpersonal interaction during the learning process. *Assessment Tools* *Basic Competencies Reference Guide and any assessment tools noted above*	Integrated throughout

Concept	Specific Learner Expectations	Notes
	The student should:	
Basic Principles	• explain sustainable development and sustained yield within the context of Canada's forests • compare principles of integrated land use with principles of multiple use management by citing examples of each within Alberta • describe local opportunities for consultation and public involvement in forest management decisions.	**This is a summative module that requires background knowledge of the principles of forestry. It should be the last module studied in a sequence of Forestry modules.**

Concept	Specific Learner Expectations	Notes
	The student should:	
Planning Process	• identify short- and long-term goals for the management of forested land on an integrated basis; e.g.: – recreation – forage – wildlife habitat – wood fibre – oil and gas	See *Alberta's Focus on Forests*: • 4.3–Forest Perspectives • Activity 5.5–Integrated Resource Management.
	• identify scientific, economic and social factors to be addressed through the management plan; e.g.: – the objectives of different stakeholders – relevant government acts and regulations – forest inventory requirements – the silvics of tree species and appropriate harvest methods – consumer trends and markets for forest products – potential applications of research and technology	Interview a local landowner to determine long-range goals for a particular woodlot/ forested region. Prepare written management plans that are consistent with the landowner's long-range goals. Compare the plans prepared with the recommendations of a professional forester.
	• survey the views of different stakeholders in the forest and resolve conflicts that may arise; e.g.: – recreational – environmental – aboriginal – industrial – agricultural	
	• incorporate consultation with other resource users and public involvement into the planning process	
	• identify alternative means of achieving the management goals, and select the preferred alternatives	
	• elaborate upon permits, licences or other legal agreements that may be required	

Concept	Specific Learner Expectations	Notes
Planning Process (continued)	*The student should:* • develop a set of actions and present the management plan; e.g.: – a general description of the forested area – long-term management objectives – short-term management objectives – proposed management standards and guidelines – a schedule of short-term development activities • prepare a map to accompany and elaborate upon the management plan; e.g.: – boundaries of the forested area – forest cover and other resources within the area – physical features – history of past development – road access – proposed development activities • describe techniques for monitoring the management plan to ensure that goals are being achieved.	Specific management plans will vary, but need to address some common actions.

FORESTRY

SECTION G: ASSESSMENT TOOLS

The following pages comprise background information and strategies for assessing student achievement using the assessment tools that are listed in Sections D, E and F of this Guide.

This section of the Guide to Standards and Implementation has been designed to provide a common base of understanding about the level of competencies students are expected to demonstrate to successfully complete a module. The goal is to establish assessment standards for junior and senior high school students that are fair, credible and challenging.

These tools will assist teachers throughout the province to more consistently assess student achievement. The purpose of expanding on the assessment standards is to:

- increase confidence among students, parents, business/industry and post-secondary that students can demonstrate the competencies specified in the modules they have completed
- encourage fairness and equity in how students' efforts are judged
- enable learners to focus effort on key learnings
- support teachers and community partners in planning and implementing CTS.

The tools were validated during the optional stage of CTS implementation.

TABLE OF CONTENTS

ASSESSING STUDENT ACHIEVEMENT

Assessing Student Achievement in CTS G.6
Assessing Student Achievement in Forestry G.8

Assessment Tools Generic to CTS:
  Basic Competencies Reference Guide G.10
  Generic Rating Scale G.12
  Frameworks for Assessment:
    CTSISS: Issue Analysis G.13
    CTSLAB: Lab Investigations G.14
    CTSNEG: Negotiation and Debate G.15
    CTSPRE: Presentations/Reports G.16
    CTSRES: Research Process G.17

Assessment Tools Generic to Forestry:
  FORPRE–1: Presentations/Reports: Introductory Level G.18
  FORPRE–2: Presentations/Reports: Intermediate Level G.19
  FORPRE–3: Presentations/Reports: Advanced Level G.20
  FORCAR–1: Career Search: Introductory Level G.21
  FORCAR–2: Career Search: Intermediate Level G.22
  FORCAR–3: Career Search: Advanced Level G.23
  FORNEG–1: Negotiation and Debate: Introductory Level G.24
  FORNEG–2: Negotiation and Debate: Intermediate Level G.25
  FORNEG–3: Negotiation and Debate: Advanced Level G.26
  FORLAB: Lab Assessment: Outdoor Forest Experiences G.27
  FORLET: Assessment Criteria: Letters of Support or Concern G.28
  FORMAP: Task Checklist for Mapping G.29
  FORMED: Guide to Critiquing Media Information G.30
  FORLOG–VOL: Log/Verification of Volunteer Work G.31
  FORREF–OUT: Reflection Guide for Outdoor Experiences G.34
  FORREF–ENV: Reflection Guide for Environmental Responsibility/Citizenship G.35
  FORPRO: Assessment Criteria: Proposal for Environmental Action G.36
  FORDRA: Assessment Criteria: Diagrams and Technical Drawings G.37
  FORFLO: Assessment Criteria: Flow Charts G.38
  FOROBS: Observation Checklist for Field-based Investigations G.39

Assessment Tools Specific to Modules in Forestry:
  FOR1010–1: Knowledge/Application Assessment: Significance of Forests G.41
  FOR1010–2 Sample Timeline: Forestry in North America G.42
  FOR1010–3: Research Process: Impacts on the Forest Resource G.44
  FOR1020–1: Lab Investigations: Factors Affecting Plant Growth G.45
  FOR1020–2: Knowledge/Application Assessment: Growth and Distribution of Forests G.46
  FOR1020–3: Museum Conservation Rules for Leaf/Twig Collection G.47
  FOR1040–1: Knowledge/Application Assessment: Hazards in the Forest Environment G.48
  FOR1040–2: Sample Assessment Items: Woods Survival 1 .... G.49

FOR1040–3: Task Checklist: Woods Survival 1 .... G.51
FOR1050–1: Portfolio Assessment: Maps Used in Forestry G.53
FOR1050–2: Task Checklist: Orienteering G.54
FOR1050–3: Knowledge/Application Assessment: Reading and Interpreting Forest Maps G.55
FOR1060–1: Research Process: Forest Surveys G.56
FOR1060–2: Task Checklist: Orienteering G.57
FOR1060–3: Task Checklist: Forest Measurement G.58
FOR1060–4: Task Checklist: Forest Survey G.59
FOR1090–1: Research Process: Forest Ecosystems G.60
FOR1090–2: Knowledge/Application Assessment: Structural Units of the Tree G.61
FOR1090–3: Lab Investigations: Tree Biology G.62
FOR1100–1: Knowledge/Application Assessment: Forest Use G.63
FOR1100–2: Knowledge/Application Assessment: Sustainability G.64
FOR1100–3: Position Paper: Forest Management G.65
FOR1100–4: Research Process: Components of Forest Protection G.66
FOR1100–5: Task Checklist: Identifying Forest Pests G.67
FOR1100–6: Identification Key for Forest Pests G.68
FOR2010–1: Guide to Inferences: Personal Impact on Forests G.73
FOR2010–2: Research Process: Recycling Techniques G.74
FOR2010–3: Issue Analysis: Reducing, Reusing and Recycling G.75
FOR2030–1: Presentations/Reports: Managing Alberta's Forested Lands G.76
FOR2030–2: Sample Timeline: Management History of Alberta's Forested Lands G.77
FOR2030–3: Sample Acts and Regulations for Managing Alberta's Forests G.78
FOR2030–4: Research Process: Allocation Procedures for Land and Timber G.80
FOR2040–1: Task Checklist: Woods Survival 2 .... G.81
FOR2040–2: Post-Trip Assessment for Woods Survival 2 .... G.83
FOR2060–1: Research Process: Random and Systematic Sampling Techniques..... G.84
FOR2060–2: Task Checklist: Sampling Fibre and Nonfibre Forest Values G.85
FOR2060–3: Sample Data Sheet: Fibre and Nonfibre Forest Values G.86
FOR2070–1: Knowledge/Application Assessment: Forest Harvest G.88
FOR2070–2: Sample Checklist: Forest Harvest Plans G.89
FOR2070–3: Sample Assessment Items: Forest Harvest G.90
FOR2070–4: Research Process: Fibre Utilization and Product Formation G.94
FOR2100–1: Knowledge/Application Assessment: Forest Management Goals G.95
FOR2100–2: Issue Analysis: Forest Use G.96
FOR2100–3: Research Process: Forest Management Practices G.97
FOR2120–1: Knowledge/Application Assessment: Users in the Forest G.98
FOR2120–2: Research Process: Multiple and Integrated Land Use G.99
FOR3010–1: Issues in Forestry G.100
FOR3060–1: Knowledge/Application Assessment: Forest Survey Data G.102
FOR3060–2: Research Process: Role of Technology in Forest Inventory G.103
FOR3070–1: Knowledge/Application Assessment: Forest Products and Services G.104
FOR3070–2: Research Process: Milling and/or Pulping Technology G.105
FOR3070–3: Assessment Criteria: A Marketing Plan G.106
FOR3080–1: Forest Technology Applications G.107

FOR3080–2: Sample Research Topics: Technology Application G.109
FOR3090–1: Knowledge/Application Assessment: Soil, Air and Water Characteristics G.110
FOR3090–2: Field Investigations: Soil, Air and Water Characteristics G.111
FOR3090–3: Guide to Inferences: Forest Ecosystems G.112
FOR3090–4: Research Process: Forest Associations G.113
FOR3090–5: Common Forest Associations in Alberta G.114
FOR3090–6: Identification Guide: Agents of Change G.117
FOR3110–1: Knowledge/Application Assessment: Silviculture G.122
FOR3110–2: Sample Format: Silvics of a Tree Species G.123
FOR3110–3: Lab Investigations: Natural and Artificial Regeneration G.125
FOR3110–4: Sample Assessment Items: Stand Establishment and Management G.126
FOR3110–5: Task Checklist: Stand Establishment and Tending G.128
FOR3110–6: Research Process: Forest Harvest Methods G.131
FOR3120–1: Knowledge/Application Assessment: Forest Management Principles G.132
FOR3120–2: Assessment Criteria: Developing a Forest Management Plan G.133

ASSESSING STUDENT ACHIEVEMENT IN CTS

The CTS assessment standards assess two basic forms of competency:

- What can a student ***do***?
  - **make** a product (e.g., wood bowl, report, garment)
  - **demonstrate** a process
    - strand-related competencies (e.g., keyboarding, hair cutting, sewing techniques, lab procedures)
    - basic competencies (e.g., resource use, safety procedures, teamwork).
- What does a student ***know***?
  - knowledge base needed to demonstrate a competency (link theory and practice).

CTS Defines *Summative* Assessment Standards

The assessment standards and tools defined for the CTS modules, referenced in Sections D, E and F of this Guide, focus on the final (or summative) assessment of student achievement.

Assessment throughout the learning period (formative assessment) will continue to evaluate how students are progressing. Teachers direct and respond to students' efforts to learn—setting and marking tasks and assignments, indicating where improvement is needed, sending out interim reports, congratulating excellence, etc.

Teachers will decide which instructional and assessment strategies to apply during the formative learning period. As formative and summative assessment are closely linked, some teachers may wish to modify the tools included in this section to use during the instructional process. Teachers may also develop their own summative assessment tools as long as the standards are consistent with the minimum expectations outlined by Alberta Education.

Grading and Reporting Student Achievement

When a student can demonstrate ALL of the exit-level competencies defined for the module (module learner expectations), the teacher will designate the module as "successfully completed." The teacher will then use accepted grading practices to determine the percentage grade to be given for the module—a mark not less than 50%.

The time frame a teacher allows a student to develop the exit-level competency is a local decision. NOTE: The Senior High School Handbook specifies that students must have access to 25 hours of instruction for each credit. Students may, however, attain the required competencies in less time and may proceed to other modules.

Teachers are encouraged to consult their colleagues to ensure grading practices are as consistent as possible.

High school teachers may wish to refer to "Directions for Reporting Student Achievement in CTS" for information on how to use the CTS course codes to report the credits that students have earned to Alberta Education. (Copies of this document have been forwarded to superintendents and senior high school principals.)

Components of Assessment Standards in CTS

The following components are included in each module:

- **module learner expectations** (in the shaded left column of the module) define the exit-level competencies students are expected to achieve to complete a module. Each MLE defines and describes critical behaviours that can be measured and observed. The student must meet the standard specified for ALL MLEs within a module to be successful.

- **suggested emphasis** (in the right column of the module) provides a guideline for the relative significance of each MLE and can be used to organize for instruction.

- **criteria and conditions** (in the middle column of the module) set the framework for the assessment of student competency, specifying the minimum standard for performance and including a reference to assessment tools, where appropriate.

  Criteria define the behaviours that a student must demonstrate to meet the designated standard. For example, the criteria could describe the various techniques that must be demonstrated when using a tool, and/or describe the minimum components of a project the student must complete.

  Conditions outline the specifications under which a student's competency can be judged. For example, the conditions could specify whether the assessment should be timed or not, or if the student should be allowed to access support resources or references.

  Standard may be defined by (1) assessment tools, which are referenced in this section (or sometimes in approved learning resources) and/or (2) "illustrative examples" of student work, if appropriate.

  Assessment Tools included in this section of the Guide tend to be of two types:

  - tools generic to a strand or to the entire CTS program; e.g., a standard five-point rating scale is used in all strands. Other generic tools include assessing reports and presentations and lab safety checklists. *(Names of these tools include the strand code [e.g., "INF" for Information Processing] and a code for the type of tool [e.g., "TDENT" for Text-Data Entry].)*
  - tools specific to a module; e.g., assessment checklist for assessing a venture plan in Enterprise and Innovation or a checklist for sketching, drawing and modelling in Design Studies. *(Names of these tools include the module code; e.g., "INF1010-1" indicating that it is the first module-specific tool used in Information Processing Module 1010.)*

Development and Validation Processes

The "Criteria and Conditions" and "Suggested Emphasis" columns have been validated with extensive input from teachers, professional associations/contacts and post-secondary institutions. The goal was prepare well-structured assessment standards and related assessment tools that:

- establish an appropriate level of challenge and rigour
- relate directly to the type of learning described in the curriculum standard
- are easy to understand
- are efficient to implement
- can provide a consistent measure of what was expected to be measured.

As students and teachers work with the assessment standards and tools, it is expected that levels of performance will increase as more and more students are able to achieve the minimum standard. Therefore, the assessment standards and related tools will continue to be monitored, and revised as necessary to ensure appropriate levels of rigour and challenge, and successful transitions for students as they leave high school and enter the workplace or related post-secondary programs.

ASSESSING STUDENT ACHIEVEMENT IN FORESTRY

Assessing student achievement in Forestry involves gathering information about what a student knows and is able to do, and comparing this information with learning outcomes defined by the curriculum (i.e., module learner expectations, assessment conditions and criteria, illustrative examples/reference sets).

Summative assessment for each module in Forestry will focus attention on process (e.g., how the student approaches/performs particular tasks) and product (e.g., quality characteristics of the task performed, item produced or service rendered). While there are also knowledge-based components of learning within each module, a greater emphasis has been suggested for learning that involves the transfer/ application of knowledge in task- or service-oriented situations.

Assessment Strategies and Tools

A variety of assessment tools are provided for assessing student performance within each module. Each tool communicates, through a five-point rating scale, a minimum standard for the completion of a learning task. Criteria for assessing the "basic competencies" students are expected to demonstrate throughout the learning process have been integrated with other performance criteria in each tool.

The assessment tools, when used collectively for a particular module, will assist teachers to assess successful module completion in an equitable and consistent manner. Depending on the way the classroom is organized, assessment tools may be used with individual students upon completion of specific learning tasks, or with the entire class at the end of a learning period.

Tools Generic to CTS

The generic rating scale has been used to develop several of the tools in CTS. A generic framework for assessing the processes CTS students apply in completing a task or project is included in this section. It is based on the notion that students will follow a process as they work through their projects and that this process has a number of sequential steps. The framework shows the increasing expectations from the introductory, to the intermediate, to the advanced level.

Some assessment tools, e.g., Presentations/ Reports (CTSPRE) are generic to CTS and have been included in this section. In assessing MLEs at the introductory level, PRE100 would be used. Since the content portion of this tool must relate specifically to an MLE in a module, the tool has been adapted, labelled and included under Assessment Tools Specific to the Forestry strand, FOR, and to the module, e.g., FOR1010 (module number), and the tool number (within the module), e.g., FOR1010–1.

The Basic Competencies Reference Guide can be used directly as a checklist or as a guide to assess these competencies through other teacher-developed tools.

Tools Generic to Forestry

Assessment tools generic to Forestry have been developed to assist in assessing student performance in key areas of learning across the scope and sequence. The generic tools communicate minimum performance standards for:

- conducting research, preparing reports and making presentations
- performing practical tasks in stand establishment, tending and maintenance
- conducting laboratory and field-based investigations
- analyzing, negotiating and debating forestry- and environment-related issues
- proposing personal/shared actions that foster environmental citizenship
- exploring career trends and conducting searches of employment opportunities.

The generic tools, referenced as applicable throughout each module in the criteria and conditions column, are identified with a six- or nine-letter code (e.g., FOROBS, FORLOG–VOL). Generic tools developed for use in modules at a specific level are further identified by a number (e.g., FORPRE–1 for introductory, FORPRE–2 for intermediate, FORPRE–3 for advanced).

Tools Specific to Forestry Modules

Other assessment tools have been developed to assess competencies that are unique to specific modules within the Forestry strand. These "module-specific" tools, also referenced in the criteria and conditions column for each module, are identified by the module number followed by a tool number (e.g., FOR1070–1 for the first module-specific tool in module FOR1070).

In some instances, authorized learning resources have been identified as assessment tools for specific modules. These learning resources usually contain test banks and other assessment strategies considered effective in establishing minimum standards for achievement.

Where appropriate, "Illustrative Examples" or "Sample Assignments/Projects" have been provided in a further attempt to communicate realistic expectations and acceptable standards of achievement.

BASIC COMPETENCIES REFERENCE GUIDE

The chart below outlines basic competencies that students endeavour to develop and enhance in each of the CTS strands and modules. Students' basic competencies should be assessed through observations involving the student, teacher(s), peers and others as they complete the requirements for each module. In general, there is a progression of task complexity and student initiative as outlined in the Developmental Framework★. **As students progress through Stages 1, 2, 3 and 4 of this reference guide, they build on the competencies gained in earlier stages**. Students leaving high school should set themselves a goal of being able to demonstrate Stage 3 performance.

Suggested strategies for classroom use include:

- having students rate themselves and each other
- using in reflective conversation between teacher and student
- highlighting areas of strength
- tracking growth in various CTS strands
- highlighting areas upon which to focus
- maintaining a student portfolio.

Stage 1— *The student:*	**Stage 2**— *The student:*	**Stage 3**— *The student:*	**Stage 4**— *The student:*
Managing Learning			
☐ comes to class prepared for learning	☐ ——►——►	☐ ——►——►	☐ ——►——►
☐ follows basic instructions, as directed	☐ follows instructions, with limited direction	☐ follows detailed instructions on an independent basis	☐ ——►——►
	☐ sets goals and establishes steps to achieve them, with direction	☐ sets clear goals and establishes steps to achieve them	☐ demonstrates self-direction in learning, goal setting and goal achievement
☐ acquires specialized knowledge, skills and attitudes	☐ applies specialized knowledge, skills and attitudes in practical situations	☐ transfers and applies specialized knowledge, skills and attitudes in a variety of situations	☐ transfers and applies learning in new situations; demonstrates commitment to lifelong learning
☐ identifies criteria for evaluating choices and making decisions	☐ identifies and applies a range of effective strategies for solving problems and making decisions	☐ uses a range of critical thinking skills to evaluate situations, solve problems and make decisions	☐ thinks critically and acts logically to evaluate situations, solve problems and make decisions
☐ uses a variety of learning strategies	☐ explores and uses a variety of learning strategies, with limited direction	☐ selects and uses effective learning strategies	☐ ——►——►
		☐ cooperates with others in the effective use of learning strategies	☐ provides leadership in the effective use of learning strategies
Managing Resources			
☐ adheres to established timelines; uses time/schedules/planners effectively	☐ creates and adheres to timelines, with limited direction; uses time/schedules/planners effectively	☐ creates and adheres to detailed timelines on an independent basis; prioritizes task; uses time/schedules/planners effectively	☐ creates and adheres to detailed timelines; uses time/schedules/planners effectively; prioritizes tasks on a consistent basis
☐ uses information (material and human resources), as directed	☐ accesses and uses a range of relevant information (material and human resources), with limited direction	☐ accesses a range of information (material and human resources), and recognizes when additional resources are required	☐ uses a wide range of information (material and human resources) in order to support and enhance the basic requirement
☐ uses technology (facilities, equipment, supplies), as directed, to perform a task or provide a service	☐ uses technology (facilities, equipment, supplies), as appropriate, to perform a task or provide a service, with minimal assistance and supervision	☐ selects and uses appropriate technology (facilities, equipment, supplies) to perform a task or provide a service on an independent basis	☐ recognizes the monetary and intrinsic value of managing technology (facilities, equipment, supplies)
☐ maintains, stores and/or disposes of equipment and materials, as directed	☐ maintains, stores and/or disposes of equipment and materials, with limited assistance	☐ maintains, stores and/or disposes of equipment and materials on an independent basis	☐ demonstrates effective techniques for managing facilities, equipment and supplies
Problem Solving and Innovation			
☐ participates in problem solving as a process ☐ learns a range of problem-solving skills and approaches	☐ identifies the problem and selects an appropriate problem-solving approach, responding appropriately to specified goals and constraints	☐ thinks critically and acts logically in the context of problem solving	☐ identifies and resolves problems efficiently and effectively
☐ practices problem-solving skills by responding appropriately to a clearly defined problem, specified goals and constraints, by: – generating alternatives – evaluating alternatives – selecting appropriate alternative(s) – taking action	☐ applies problem-solving skills to a directed or a self-directed activity, by: – generating alternatives – evaluating alternatives – selecting appropriate alternative(s) – taking action	☐ transfers problem-solving skills to real-life situations, by generating new possibilities ☐ prepares implementation plans ☐ recognizes risks	☐ identifies and suggests new ideas to get the job done creatively, by: – combining ideas or information in new ways – making connections among seemingly unrelated ideas – seeking out opportunities in an active manner

Stage 1— *The student:*	**Stage 2**— *The student:*	**Stage 3**— *The student:*	**Stage 4**— *The student:*
Communicating Effectively			
☐ uses communication skills; e.g., reading, writing, illustrating, speaking	☐ communicates thoughts, feelings and ideas to justify or challenge a position, using written, oral and/or visual means	☐ prepares and effectively presents accurate, concise, written, visual and/or oral reports providing reasoned arguments	☐ negotiates effectively, by working toward an agreement that may involve exchanging specific resources or resolving divergent interests
☐ uses language in appropriate context	☐ uses technical language appropriately	☐ encourages, persuades, convinces or otherwise motivates individuals	☐ negotiates and works toward a consensus
☐ listens to understand and learn	☐ listens and responds to understand and learn	☐ listens and responds to understand, learn and teach	☐ listens and responds to understand, learn, teach and evaluate
☐ demonstrates positive interpersonal skills in selected contexts	☐ demonstrates positive interpersonal skills in many contexts	☐ demonstrates positive interpersonal skills in most contexts	☐ promotes positive interpersonal skills among others
Working with Others			
☐ fulfills responsibility in a group project	☐ ——→——→	☐ seeks a team approach, as appropriate, based on group needs and benefits; e.g., idea potential, variety of strengths, sharing of workload	☐ leads, where appropriate, mobilizing the group for high performance
☐ works collaboratively in structured situations with peer members	☐ cooperates to achieve group results	☐ works in a team or group: – encourages and supports team members – helps others in a positive manner – provides leadership/ followership as required – negotiates and works toward consensus as required	☐ understands and works within the context of the group
☐ acknowledges the opinions and contributions of others in the group	☐ maintains a balance between speaking, listening and responding in group discussions		☐ prepares, validates and implements plans that reveal new possibilities
	☐ respects the feelings and views of others		
Demonstrating Responsibility			
Attendance			
☐ demonstrates responsibility in attendance, punctuality and task completion	☐ ——→——→	☐ ——→——→	☐ ——→——→
Safety			
☐ follows personal and environmental health and safety procedures	☐ recognizes and follows personal and environmental health and safety procedures	☐ establishes and follows personal and environmental health and safety procedures	☐ transfers and applies personal and environmental health and safety procedures to a variety of environments and situations
☐ identifies immediate hazards and their impact on self, others and the environment	☐ identifies immediate and potential hazards and their impact on self, others and the environment	☐ ——→——→	☐ ——→——→
☐ follows appropriate/emergency response procedures	☐ ——→——→	☐ ——→——→	☐ ——→——→
			☐ demonstrates accountability for actions taken to address immediate and potential hazards
Ethics			
☐ makes personal judgements about whether or not certain behaviours/actions are right or wrong	☐ assesses how personal judgements affect other peer members and/or family; e.g., home and school	☐ assesses the implications of personal/group actions within the broader community; e.g., workplace	☐ analyzes the implications of personal/group actions within the global context
			☐ states and defends a personal code of ethics as required

★ Developmental Framework • *Simple task* • *Structured environment* • *Directed learning*	• *Task with limited variables* • *Less structured environment* • *Limited direction*	• *Task with multiple variables* • *Flexible environment* • *Self-directed learning, seeking assistance as required*	• *Complex task* • *Open environment* • *Self-directed/self-motivated*

GENERIC RATING SCALE

SCALE	**RUBRIC STATEMENT** **(included in assessment tool/statements in *italics* are optional)** ***The student:***	**IS TASK/ PROJECT COMPLETED?**	**PROBLEM SOLVING: STUDENT INITIATIVE VS TEACHER DIRECTION/ SUPPORT**	**USE OF TOOLS, MATERIALS, PROCESSES**	***STANDARDS OF QUALITY/ PRODUCTIVITY***	***TEAMWORK LEADERSHIP***	***SERVICE CLIENT/ CUSTOMER***
4	exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence. *Quality, particularly details and finishes, and productivity are consistent and exceed standards. Leads others to contribute team goals. Analyzes and provides effective client/customer services beyond expectations.*	Exceeds defined outcomes.	Plans and solves problems effectively and creatively in a self-directed manner.	Tools, materials and/or processes are selected and used efficiently, effectively and with confidence.	*Quality, particularly details and finishes, and productivity are consistent and exceed standards.*	*Leads others to contribute team goals.*	*Analyzes and provides effective client/customer services beyond expectations.*
3	meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively. *Quality and productivity are consistent. Works cooperatively and contributes ideas and suggestions that enhance team effort. Analyzes and provides effective client/customer services.*	Meets defined outcomes.	Plans and solves problems in a self-directed manner.	Tools, materials and/or processes are selected and used efficiently and effectively.	*Quality and productivity are consistent.*	*Works cooperatively and contributes ideas and suggestions that enhance team effort.*	*Analyzes and provides effective client/customer services.*
2	meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively to achieve team goals. Identifies and provides customer/client services.*	Meets defined outcomes.	Plans and solves problems with limited assistance.	Tools, materials and/or processes are selected and used appropriately.	*Quality and productivity are reasonably consistent.*	*Works cooperatively to achieve team goals.*	*Identifies and provides customer/client services.*
1	meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately. *Quality and productivity are reasonably consistent. Works cooperatively. Provides a limited range of customer/client services.*	Meets defined outcomes.	Follows a guided plan of action.	A limited range of tools, materials and/or processes are used appropriately.	*Quality and productivity are reasonably consistent.*	*Works cooperatively.*	*Provides a limited range of customer/client services.*
O	has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.	Has not completed defined outcomes.		Tools, materials and/or processes are used inappropriately.			

ASSESSMENT FRAMEWORK: ISSUE ANALYSIS

INTRODUCTORY	INTERMEDIATE	ADVANCED
The student:	*The student:*	*The student:*
Preparation and Planning	**Preparation and Planning**	**Preparation and Planning**
• accurately describes an issue on which people disagree	• accurately describes an issue on which people disagree, explaining areas of disagreement	• accurately describes an issue on which people disagree, explaining specific causes of disagreement
• poses an important question regarding the issue	• poses one or more thoughtful questions regarding the issue	• poses thoughtful questions regarding the issue
• accesses basic in-school/community information sources regarding the issue	• accesses a range of relevant in-school/community resources	• accesses a range of relevant information sources and recognizes when additional information is required
• uses one or more information-gathering techniques	• uses a range of information-gathering techniques	• demonstrates resourcefulness in collecting data
Analyzing Perspectives	**Analyzing Perspectives**	**Analyzing Perspectives**
• clarifies different points of view regarding the issue; *e.g., social, economic, environmental*	• categorizes different points of view regarding the issue; *e.g., cultural, ethical, economic, environmental, health-related*	• categorizes different points of view regarding the issue; *e.g., cultural, ethical, economic, environmental, health-related, scientific, political*
• states a position on the issue and logical reasons for adopting that position	• states a position on the issue and logical reasons for adopting that position	• states a position on the issue and insightful reasons for adopting that position
• states an opposing position on the issue and logical reasons for adopting that position	• states two or more opposing positions on the issue and logical reasons for adopting each position	• states three or more opposing positions on the issue and thoughtful reasons for adopting each position
• identifies sources of conflict among different positions	• describes interrelationships among different perspectives/points of view	• analyzes interrelationships among different perspectives/points of view
• distinguishes between fact and fiction/opinion/theory	• determines accuracy/currency/reliability of information and ideas	• recognizes underlying bias/assumptions/values in information and ideas
Collaboration and Teamwork	**Collaboration and Teamwork**	**Collaboration and Teamwork**
• shares work appropriately among group members	• shares work appropriately among group members	• shares work appropriately among group members
• respects the views of others	• respects and considers the views of others	• respects and considers the views of others
	• negotiates solutions to problems	• negotiates with sensitivity solutions to problems
Evaluating Choices/Making Decisions	**Evaluating Choices/Making Decisions**	**Evaluating Choices/Making Decisions**
• identifies useful alternatives regarding the issue	• identifies important and appropriate alternatives regarding the issue	• describes in detail important and appropriate alternatives regarding the issue
• establishes criteria for assessing each alternative; *e.g., social, economic, environmental*	• establishes knowledge- and value-based criteria for assessing each alternative; *e.g., social, economic, environmental*	• establishes knowledge- and value-based criteria for assessing each alternative; *e.g., social, economic, environmental*
• selects an appropriate alternative based on established criteria	• selects an appropriate alternative by showing differences among choices	• selects an appropriate and useful alternative by showing differences among choices
• reflects on strengths/weaknesses of decisions by considering consequences	• assesses strengths/weaknesses of decisions by considering consequences	• assesses strengths/weaknesses of decisions by considering consequences and implications
• communicates information in a logical sequence to justify choices/decisions made	• communicates ideas in a logical sequence with supporting detail to justify choices/decisions made	• communicates thoughts/feelings/ideas clearly to justify choices/decisions made

ASSESSMENT FRAMEWORK: LAB INVESTIGATIONS

CTSLAB

INTRODUCTORY	INTERMEDIATE	ADVANCED
The student:	*The student:*	*The student:*
Management • prepares self for task • organizes and works in an orderly manner • carries out instructions accurately • uses time effectively	**Management** • prepares self for task • organizes and works in an orderly manner • interprets and carries out instructions accurately • plans and uses time effectively • adheres to routine procedures	**Management** • prepares self for task • organizes and works in an orderly manner • interprets and carries out instructions accurately • plans and uses time effectively in a logical sequence • displays leadership in adhering to routine procedures • attempts to solve problems prior to requesting help
Teamwork • cooperates with group members • shares work appropriately among group members	**Teamwork** • cooperates with group members • shares work appropriately among group members • negotiates solutions to problems	**Teamwork** • cooperates with group members • shares work appropriately among group members • negotiates with sensitivity solutions to problems • displays effective communication skills
Equipment and Materials • selects and uses appropriate equipment/materials • follows safe procedures/techniques • weighs and measures accurately • returns clean equipment/materials to storage areas	**Equipment and Materials** • selects and uses appropriate equipment/materials • models safe procedures/techniques • weighs and measures accurately • practises proper sanitation procedures • minimizes waste of materials • advises of potential hazards and necessary repairs	**Equipment and Materials** • selects and uses equipment/materials independently • demonstrates concern for safe procedures/techniques • weighs and measures accurately and efficiently • practises proper sanitation procedures • minimizes waste of materials • anticipates potential hazards and emergency response
Investigative Techniques • gathers and applies information from at least one source • makes predictions that can be tested • sets up and conducts experiments to test a prediction • distinguishes between manipulated/responding variables • obtains results that can be used to determine if some aspect of the prediction is accurate • summarizes important experimental outcomes	**Investigative Techniques** • gathers and applies information from a variety of sources • makes predictions that can be tested • plans, sets up and conducts experiments to test a prediction • identifies and explains manipulated/responding variables • obtains accurate results that confirm/reject the prediction • summarizes and applies experimental outcomes	**Investigative Techniques** • uses relevant information to explain observations • makes predictions that can be tested • plans, sets up and conducts experiments to test a prediction • analyzes relationships among manipulated/responding variables • obtains accurate results that confirm/reject prediction and answer related questions • summarizes, applies and evaluates experimental outcomes

ASSESSMENT FRAMEWORK: NEGOTIATION AND DEBATE

CTSNEG

INTRODUCTORY	INTERMEDIATE	ADVANCED
The student:	*The student:*	*The student:*
Preparation and Planning	**Preparation and Planning**	**Preparation and Planning**
• accurately describes an issue on which people disagree	• accurately describes an issue on which people disagree, explaining areas of disagreement	• accurately describes an issue on which people disagree, explaining specific causes of disagreement
• poses an important question regarding the issue	• poses one or more thoughtful questions regarding the issue	• poses thoughtful questions regarding the issue
• accesses basic in-school/community information sources regarding the issue	• accesses a range of relevant in-school/community resources	• accesses a range of relevant information sources and recognizes when additional information is required
• uses one or more information-gathering techniques	• uses a range of information-gathering techniques	• demonstrates resourcefulness in collecting data
Analyzing Perspectives	**Analyzing Perspectives**	**Analyzing Perspectives**
• states a position on the issue and logical reasons for adopting that position	• states a position on the issue and logical reasons for adopting that position	• states a position on the issue and insightful reasons for adopting that position
• explains why the issue is important by presenting examples of possible consequences	• explains why the issue is important by presenting examples of possible consequences	• explains why the issue is important by presenting examples of possible consequences and implications
• clarifies different points of view regarding the issue; *e.g., social, economic, environmental*	• categorizes different points of view regarding the issue; *e.g., cultural, ethical, economic, environmental, health-related*	• categorizes different points of view regarding the issue; *e.g., cultural, ethical, economic, environmental, health-related, scientific, political*
• distinguishes between fact and fiction/opinion/theory	• determines accuracy/currency/reliability of information and ideas	• recognizes underlying bias/assumptions/values in information and ideas
Collaboration and Teamwork	**Collaboration and Teamwork**	**Collaboration and Teamwork**
• works with a range of peer members	• works with a range of peer members	• works with a wide range of peer members
• shares information/opinions/suggestions through group discussion	• shares information/opinions/suggestions, maintaining a balance between speaking and listening	• shares information/opinions/suggestions, maintaining a balance between speaking and listening
• listens to and respects the views of others	• listens to and respects the views of others, requesting clarification as necessary from other group members	• listens to and respects the views of others, requesting clarification as necessary from other group members
Negotiating and Debating	**Negotiating and Debating**	**Negotiating and Debating**
• presents a convincing argument in logical sequence supporting a position adopted on the issue	• presents a convincing argument in logical sequence supporting a position adopted, conveying points in order of importance	• presents a convincing argument in logical sequence supporting a position adopted, conveying points in order of importance and backing each with sound evidence
• provides a relevant response to opposing arguments	• provides a relevant and convincing response to opposing arguments	• provides a relevant and convincing rebuttal to opposing arguments
• speaks clearly so the argument can be understood	• speaks clearly without hesitation so the argument can be understood	• speaks clearly without hesitation so the argument can be understood by all listeners
• establishes a shared understanding of key alternatives and consequences relevant to the issue	• negotiates a shared agreement on preferred alternatives relevant to the issue	• negotiates a shared agreement on preferred alternatives by resolving divergent points of view

ASSESSMENT FRAMEWORK: PRESENTATIONS/REPORTS

CTSPRE

INTRODUCTORY	INTERMEDIATE	ADVANCED
The student:	*The student:*	*The student:*
Preparation and Planning	**Preparation and Planning**	**Preparation and Planning**
• sets goals and follows instructions accurately	• sets goals and describes steps to achieve them	• sets goals and describes steps to achieve them
• responds to directed questions and follows necessary steps to find answers	• uses personal initiative to formulate questions and find answers	• uses personal initiative to formulate questions and find answers
• accesses basic in-school/community information sources	• accesses a range of relevant in-school/community resources	• accesses a range of relevant information sources and recognizes when additional information is required
• interprets and organizes information into a logical sequence	• interprets, organizes and combines information into a logical sequence	• interprets, organizes and combines information in creative and thoughtful ways
• records information accurately, using correct technical terms	• records information accurately with appropriate supporting detail and using correct technical terms	• records information accurately, using appropriate technical terms and supporting detail
• uses time effectively	• plans and uses time effectively	• plans and uses time effectively, prioritizing tasks on a consistent basis
	• gathers and responds to feedback regarding approach to task and project status	• assesses and refines approach to task and project status based on feedback and reflection
Presentation	**Presentation**	**Presentation**
• demonstrates effective use of at least one medium of communication:	• demonstrates effective use of at least two communication media:	• demonstrates effective use of a variety of communication media:
e.g., Written: *spelling, punctuation, grammar, basic format*	*e.g., Written:* *spelling, punctuation, grammar, format (formal/informal)*	*e.g., Written:* *spelling, punctuation, grammar, format (formal/informal, technical/literary)*
Oral: *voice projection, body language*	*Oral:* *voice projection, body language, appearance*	*Oral:* *voice projection, body language, appearance, enthusiasm, evidence of prior practice*
Audio-Visual: *techniques, tools*	*Audio-Visual:* *techniques, tools, clarity*	*Audio-Visual:* *techniques, tools, clarity, speed and pacing*
• uses correct grammatical convention and technical terms through proofreading/editing	• maintains acceptable grammatical and technical standards through proofreading and editing	• maintains acceptable grammatical and technical standards through proofreading and editing
• provides an introduction that describes the purpose of the project	• provides an introduction that describes the purpose and scope of the project	• provides an introduction that describes the purpose and scope of the project
• communicates information in a logical sequence	• communicates ideas into a logical sequence with sufficient supporting detail	• communicates thoughts/feelings/ideas clearly to justify or challenge a position
• states a conclusion based on a summary of facts	• states a conclusion by synthesizing the information gathered	• states a conclusion by analyzing and synthesizing the information gathered
• provides a reference list of three or more basic information sources	• provides a reference list that includes five or more relevant information sources	• gives evidence of adequate research through a reference list including seven or more relevant information sources

ASSESSMENT FRAMEWORK: RESEARCH PROCESS

CTSRES

INTRODUCTORY	INTERMEDIATE	ADVANCED
The student:	*The student:*	*The student:*
Preparation and Planning • sets goals and follows instructions accurately • adheres to established timelines • responds to directed questions and follows necessary steps to find answers • uses time effectively	**Preparation and Planning** • sets goals and establishes steps to achieve them • creates and adheres to useful timelines • uses personal initiative to formulate questions and find answers • plans and uses time effectively	**Preparation and Planning** • sets clear goals and establishes steps to achieve them • creates and adheres to detailed timelines • uses personal initiative to formulate questions and find answers • plans and uses time effectively, prioritizing tasks on a consistent basis
Information Gathering and Processing • accesses basic in-school/community information sources • uses one or more information-gathering techniques • interprets and organizes information in a logical sequence • records information accurately, using correct technical terms • distinguishes between fact and fiction/opinion/theory • responds to feedback when current approach is not working	**Information Gathering and Processing** • accesses a range of relevant in-school/community resources • uses a range of information-gathering techniques • interprets, organizes and combines information into a logical sequence • records information accurately with appropriate supporting detail and using correct technical terms • determines accuracy/currency/reliability of information sources • gathers and responds to feedback regarding approach to the task	**Information Gathering and Processing** • accesses a range of relevant information sources and recognizes when additional information is required • demonstrates resourcefulness in collecting data • interprets, organizes and combines information in creative and thoughtful ways • records information accurately with appropriate supporting detail and using correct technical terms • recognizes underlying bias/assumptions/values in information sources • assesses and refines approach to the task and project status based on feedback and reflection
Collaboration and Teamwork • cooperates with group members • shares work appropriately among group members	**Collaboration and Teamwork** • cooperates with group members • shares work appropriately among group members • negotiates solutions to problems	**Collaboration and Teamwork** • cooperates with group members • shares work appropriately among group members • negotiates with sensitivity solutions to problems • displays effective communication and leadership skills
Information Sharing • demonstrates effective use of one or more communication media; *e.g., written, oral, audio-visual* • communicates information in a logical sequence • uses correct grammatical convention and technical terms • cites three or more basic information sources	**Information Sharing** • demonstrates effective use of two or more communication media; *e.g., written, oral, audio-visual* • communicates ideas in a logical sequence with sufficient supporting detail • maintains acceptable grammatical and technical standards • cites five or more relevant information sources	**Information Sharing** • demonstrates effective use of a variety of communication media; *e.g., written, oral, audio-visual* • communicates thoughts/feelings/ideas clearly to justify or challenge a position • maintains acceptable grammatical and technical standards • gives evidence of adequate information gathering by citing seven or more relevant information sources

PRESENTATIONS/REPORTS: Introductory Level FORPRE–1

TASK	OBSERVATION/RATING					
Preparation and Planning	4	3	2	1	0	N/A
Content	4	3	2	1	0	N/A
Presenting/ Reporting	4	3	2	1	0	N/A

STANDARD IS 1 IN EACH APPLICABLE TASK

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence.

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively.

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately.

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately.

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

N/A Not Applicable

TASK CHECKLIST

The student:

Preparation and Planning

- ☐ sets goals and follows instruction accurately
- ☐ responds to directed questions and follows necessary steps to find answers
- ☐ accesses basic in-school/community information sources
- ☐ interprets and organizes information into a logical sequence
- ☐ records information accurately, using correct technical terms
- ☐ uses time effectively

Content

Content (continued)

Presenting/Reporting

- ☐ demonstrates effective use of at least one medium of communication:

  e.g., Written: *spelling, punctuation, grammar, basic format*
  Oral: *voice projection, body language*
  Audio-Visual: *techniques, tools*

- ☐ uses correct grammatical convention and technical terms through proofreading/editing
- ☐ provides an introduction that describes the purpose of the project
- ☐ communicates information in a logical sequence
- ☐ states a conclusion based on a summary of facts
- ☐ provides a reference list of three or more basic information sources

REFLECTIONS/COMMENTS:

PRESENTATIONS/REPORTS: Intermediate Level FORPRE–2

TASK	OBSERVATION/RATING					
Preparation and Planning	4	3	2	1	0	N/A
Content	4	3	2	1	0	N/A
Presenting/ Reporting	4	3	2	1	0	N/A

STANDARD IS 2 IN EACH APPLICABLE TASK

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence.

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively.

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately.

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately.

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

N/A Not Applicable

TASK CHECKLIST

The student:

Preparation and Planning

- ☐ sets goals and describes steps to achieve them
- ☐ uses personal initiative to formulate questions and find answers
- ☐ accesses a range of relevant in-school/ community resources
- ☐ interprets, organizes and combines information into a logical sequence
- ☐ records information accurately with appropriate supporting detail and using correct technical terms
- ☐ plans and uses time effectively
- ☐ gathers and responds to feedback regarding approach to task and project status

Content

Content (continued)

Presenting/Reporting

- ☐ demonstrates effective use of at least two communication media:
  - *e.g., Written:* *spelling, punctuation, grammar, format (formal/ informal)*
  - *Oral:* *voice projection, body language, appearance*
  - *Audio-Visual:* *techniques, tools, clarity*
- ☐ maintains acceptable grammatical and technical standards through proofreading and editing
- ☐ provides an introduction that describes the purpose and scope of the project
- ☐ communicates ideas into a logical sequence with sufficient supporting detail
- ☐ states a conclusion by synthesizing the information gathered
- ☐ provides a reference list that includes five or more relevant information sources

REFLECTIONS/COMMENTS:

PRESENTATIONS/REPORTS: Advanced Level FORPRE–3

TASK	OBSERVATION/RATING					
Preparation and Planning	4	3	2	1	0	N/A
Content	4	3	2	1	0	N/A
Presenting/ Reporting	4	3	2	1	0	N/A

STANDARD IS 3 IN EACH APPLICABLE TASK

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence.

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively.

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately.

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately.

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

N/A Not Applicable

TASK CHECKLIST

The student:

Preparation and Planning

☐ sets goals and describes steps to achieve them
☐ uses personal initiative to formulate questions and find answers
☐ accesses a range of relevant information sources and recognizes when additional information is required
☐ interprets, organizes and combines information in creative and thoughtful ways
☐ records information accurately, using appropriate technical terms and supporting detail
☐ plans and uses time effectively, prioritizing tasks on a consistent basis
☐ accesses and refines approach to task and project status based on feedback and reflection

Content

Content (continued)

Presenting/Reporting

☐ demonstrates effective use of at least one medium of communication:

e.g., *Written:* *spelling, punctuation, grammar, format (formal/ informal, technical/literary)*
Oral: *voice projection, body language, appearance, enthusiasm, evidence of prior practice*
Audio-Visual: *techniques, tools, clarity, speed and pacing*

☐ maintains acceptable grammatical and technical standards through proofreading and editing
☐ provides an introduction that describes the purpose and scope of the project
☐ communicates thoughts/feelings/ideas clearly to justify or challenge a position
☐ states a conclusion by analyzing and synthesizing the information gathered
☐ gives evidence of adequate research through a reference list including seven or more relevant information sources

REFLECTIONS/COMMENTS:

CAREER SEARCH: Introductory Level FORCAR-1

TASK	OBSERVATION/RATING					
Preparation and Planning	4	3	2	1	0	N/A
Information Gathering and Processing	4	3	2	1	0	N/A
Content	4	3	2	1	0	N/A
Collaboration and Teamwork	4	3	2	1	0	N/A
Information Sharing	4	3	2	1	0	N/A

STANDARD IS 1 IN EACH APPLICABLE TASK

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence.

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively.

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately.

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately.

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

N/A Not Applicable

TASK CHECKLIST

The student:

Preparation and Planning
- ☐ sets goals and follows instructions accurately
- ☐ adheres to established timelines
- ☐ responds to directed questions and follows necessary steps to find answers
- ☐ uses time effectively

Information Gathering and Processing
- ☐ accesses basic in-school/community information sources
- ☐ uses one or more information-gathering techniques
- ☐ interprets and organizes information into a logical sequence
- ☐ records information accurately, using correct technical terms
- ☐ distinguishes between fact and fiction/opinion/theory
- ☐ responds to feedback when current approach is not working

Content
- ☐ describes one or more career opportunities within the field; e.g.:
  - labour-based
  - technical
  - professional

Content (continued)
- ☐ identifies and describes occupations relevant to one or more career opportunities; e.g.:
  - nature of the occupation
  - duties of the employee
- ☐ provides a survey of current employment statistics relevant to one or more careers; e.g.:
  - types of occupations
  - number of employees
- ☐ identifies entrance requirements and training programs relevant to one or more careers; e.g.:
  - entrance requirements and competencies
  - type of training programs
- ☐ assesses current and future employment opportunities and trends; e.g.:
  - local and national needs
  - opportunities for advancement

Collaboration and Teamwork
- ☐ cooperates with group members
- ☐ shares work appropriately among group members

Information Sharing
- ☐ demonstrates effective use of one or more communication media:
  e.g., written, oral, audio-visual
- ☐ communicates information in a logical sequence
- ☐ uses correct grammatical conventions and technical terms
- ☐ cites three or more basic information sources

REFLECTIONS/COMMENTS:

CAREER SEARCH: Intermediate Level FORCAR–2

TASK	OBSERVATION/RATING					
Preparation and Planning	4	3	2	1	0	N/A
Information Gathering and Processing	4	3	2	1	0	N/A
Content	4	3	2	1	0	N/A
Collaboration and Teamwork	4	3	2	1	0	N/A
Information Sharing	4	3	2	1	0	N/A

STANDARD IS 2 IN EACH APPLICABLE TASK

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence.

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively.

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately.

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately.

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

N/A Not Applicable

TASK CHECKLIST

The student:

Preparation and Planning
- ☐ sets goals and establishes steps to achieve them
- ☐ creates and adheres to useful timelines
- ☐ uses personal initiative to formulate questions and find answers
- ☐ plans and uses time effectively

Information Gathering and Processing
- ☐ accesses a range of relevant in-school/community resources
- ☐ uses a range of information-gathering techniques
- ☐ interprets, organizes and combines information into a logical sequence
- ☐ records information accurately with appropriate supporting detail and using correct technical terms
- ☐ determines accuracy/currency/reliability of information sources
- ☐ gathers and responds to feedback regarding approach to the task

Content
- ☐ describes one or more career opportunities within the field; e.g.:
  - labour-based
  - technical
  - professional
- ☐ identifies and describes occupations relevant to one or more career opportunities; e.g.:
  - nature of the occupation
  - duties of the employee
  - workplace conditions

Content (continued)
- ☐ provides a survey of current employment statistics relevant to one or more careers; e.g.:
  - types of occupations
  - number of employees
  - employment trends
- ☐ identifies entrance requirements and training programs relevant to one or more careers; e.g.:
  - entrance requirements and competencies
  - type and extent of training programs
- ☐ assesses current and future employment opportunities and trends; e.g.:
  - local, national and international needs
  - opportunities for advancement and/or career change

Collaboration and Teamwork
- ☐ cooperates with group members
- ☐ shares work appropriately among group members
- ☐ negotiates solutions to problems

Information Sharing
- ☐ demonstrates effective use of two or more communication media:
  e.g., written, oral, audio-visual
- ☐ communicates ideas in a logical sequence with sufficient supporting detail
- ☐ maintains acceptable grammatical and technical standards
- ☐ cites five or more relevant information sources

REFLECTIONS/COMMENTS:

CAREER SEARCH: Advanced Level FORCAR–3

TASK	OBSERVATION/RATING					
Preparation and Planning	4	3	2	1	0	N/A
Information Gathering and Processing	4	3	2	1	0	N/A
Content	4	3	2	1	0	N/A
Collaboration and Teamwork	4	3	2	1	0	N/A
Information Sharing	4	3	2	1	0	N/A

STANDARD IS 3 IN EACH APPLICABLE TASK

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence.

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively.

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately.

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately.

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

N/A Not Applicable

TASK CHECKLIST

The student:

Preparation and Planning

☐ sets clear goals and establishes steps to achieve them
☐ creates and adheres to detailed timelines
☐ uses personal initiative to formulate questions and find answers
☐ plans and uses time effectively, prioritizing tasks on a consistent basis

Information Gathering and Processing

☐ accesses a range of relevant information sources and recognizes when additional information is required
☐ demonstrates resourcefulness in collecting data
☐ interprets, organizes and combines information in creative and thoughtful ways
☐ records information accurately with appropriate supporting detail and using correct technical terms
☐ recognizes underlying bias/assumptions/values in information sources
☐ assesses and refines approach to the task and project status based on feedback and reflection

Content

☐ describes one or more career opportunities within the field; e.g.:
  - labour-based
  - technical
  - professional
☐ identifies and describes occupations relevant to one or more career opportunities; e.g.:
  - nature of the occupation
  - duties of the employee
  - workplace conditions
  - salary/wages and employee benefits

Content (continued)

☐ provides a survey of current employment statistics relevant to one or more careers; e.g.:
  - types of occupations
  - number of employees
  - employment trends
☐ identifies entrance requirements and training programs relevant to one or more careers; e.g.:
  - entrance requirements and competencies
  - type and extent of training programs
  - post-secondary institutions
☐ assesses current and future employment opportunities and trends; e.g.:
  - local, national and international needs
  - opportunities for advancement and/or career change
  - opportunities for self-employment and entrepreneurship

Collaboration and Teamwork

☐ cooperates with group members
☐ shares work appropriately among group members
☐ negotiates with sensitivity solutions to problems
☐ displays effective communication and leadership skills

Information Sharing

☐ demonstrates effective use of a variety of communication media:
e.g., written, oral, audio-visual
☐ communicates thoughts/feelings/ideas clearly to justify or challenge a position
☐ maintains acceptable grammatical and technical standards
☐ gives evidence of adequate information gathering by citing seven or more relevant information sources

REFLECTIONS/COMMENTS:

NEGOTIATION AND DEBATE: Introductory Level FORNEG–1

TASK	OBSERVATION/RATING					
Preparation and Planning	4	3	2	1	0	N/A
Analyzing Perspectives	4	3	2	1	0	N/A
Collaboration and Teamwork	4	3	2	1	0	N/A
Negotiating and Debating	4	3	2	1	0	N/A

STANDARD IS 1 IN EACH APPLICABLE TASK

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence.

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively.

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately.

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately.

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

N/A Not Applicable

TASK CHECKLIST

The student:

Preparation and Planning

☐ accurately describes an issue on which people disagree
☐ poses an important question regarding the issue
☐ accesses basic in-school/community information sources regarding the issue
☐ uses one or more information-gathering techniques

Analyzing Perspectives

☐ states a position on the issue and logical reasons for adopting that position
☐ explains why the issue is important by presenting examples of possible consequences
☐ clarifies different points of view regarding the issue; *e.g., social, economic, environmental*
☐ distinguishes between fact and fiction/opinion/theory

Collaboration and Teamwork

☐ works with a range of peer members
☐ shares information/opinions/suggestions through group discussion
☐ listens to and respects the views of others

Negotiating and Debating

☐ presents a convincing argument in logical sequence supporting a position adopted on the issue
☐ provides a relevant response to opposing arguments
☐ speaks clearly so the argument can be understood
☐ establishes a shared understanding of key alternatives and consequences relevant to the issue

REFLECTIONS/COMMENTS:

TASK	OBSERVATION/RATING					
Preparation and Planning	4	3	2	1	0	N/A
Analyzing Perspectives	4	3	2	1	0	N/A
Collaboration and Teamwork	4	3	2	1	0	N/A
Negotiating and Debating	4	3	2	1	0	N/A

STANDARD IS 2 IN EACH APPLICABLE TASK

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence.

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively.

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately.

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately.

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

N/A Not Applicable

TASK CHECKLIST

The student:

Preparation and Planning

☐ accurately describes an issue on which people disagree, explaining areas of disagreement
☐ poses one or more thoughtful questions regarding the issue
☐ accesses a range of relevant in-school/community resources
☐ uses a range of information-gathering techniques

Analyzing Perspectives

☐ states a position on the issue and logical reasons for adopting that position
☐ explains why the issue is important by presenting examples of possible consequences categorizes different points of view regarding the issue; *e.g., cultural, ethical, economic, environmental, health-related*
☐ determines accuracy/currency/reliability of information and ideas

Collaboration and Teamwork

☐ works with a range of peer members
☐ shares information/opinions/suggestions, maintaining a balance between speaking and listening
☐ listens to and respects the views of others, requesting clarification as necessary from other group members

Negotiating and Debating

☐ presents a convincing argument in logical sequence supporting a position adopted, conveying points in order of importance
☐ provides a relevant and convincing response to opposing arguments
☐ speaks clearly without hesitation so the argument can be understood
☐ negotiates a shared agreement on preferred alternatives relevant to the issue

REFLECTIONS/COMMENTS:

NEGOTIATION AND DEBATE: Advanced Level FORNEG–3

TASK	OBSERVATION/RATING					
Preparation and Planning	4	3	2	1	0	N/A
Analyzing Perspectives	4	3	2	1	0	N/A
Collaboration and Teamwork	4	3	2	1	0	N/A
Negotiating and Debating	4	3	2	1	0	N/A

STANDARD IS 3 IN EACH APPLICABLE TASK

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence.

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively.

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately.

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately.

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

N/A Not Applicable

TASK CHECKLIST

The student:

Preparation and Planning

- ☐ accurately describes an issue on which people disagree, explaining specific causes of disagreement
- ☐ poses thoughtful questions regarding the issue
- ☐ accesses a range of relevant information sources and recognizes when additional information is required
- ☐ demonstrates resourcefulness in collecting data

Analyzing Perspectives

- ☐ states a position on the issue and insightful reasons for adopting that position
- ☐ explains why the issue is important by presenting examples of possible consequences and implications
- ☐ categorizes different points of view regarding the issue;
  e.g., cultural, ethical, economic, environmental, health-related, scientific, political
- ☐ recognizes underlying bias/assumptions/values in information and ideas

Collaboration and Teamwork

- ☐ works with a wide range of peer members
- ☐ shares information/opinions/suggestions, maintaining a balance between speaking and listening
- ☐ listens to and respects the views of others, requesting clarification as necessary from other group members

Negotiating and Debating

- ☐ presents a convincing argument in logical sequence supporting a position adopted, conveying points in order of importance and backing each with sound evidence
- ☐ provides a relevant and convincing rebuttal to opposing arguments
- ☐ speaks clearly without hesitation so the argument can be understood by all listeners
- ☐ negotiates a shared agreement on preferred alternatives by resolving divergent points of view

REFLECTIONS/COMMENTS:

LAB ASSESSMENT: Outdoor Forest Experiences FORLAB

Student Name: ______________________

Module(s): FOR104 FOR105 FOR106 FOR204 FOR206 FOR311

ACTIVITY/ TASK:						
DATE:						
Management	4 3 2 1 0	4 3 2 1 0	4 3 2 1 0	4 3 2 1 0	4 3 2 1 0	4 3 2 1 0
Teamwork	4 3 2 1 0	4 3 2 1 0	4 3 2 1 0	4 3 2 1 0	4 3 2 1 0	4 3 2 1 0
Equipment and Materials	4 3 2 1 0	4 3 2 1 0	4 3 2 1 0	4 3 2 1 0	4 3 2 1 0	4 3 2 1 0
Environmental Ethics	4 3 2 1 0	4 3 2 1 0	4 3 2 1 0	4 3 2 1 0	4 3 2 1 0	4 3 2 1 0

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence.

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively.

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately.

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately.

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

N/A Not Applicable

ASSESSMENT CRITERIA

The student:

Management

☐ prepares self for task
☐ organizes and works in an orderly manner
☐ interprets and carries out instructions accurately
☐ plans and uses time in a logical sequence
☐ attempts to solve problems prior to requesting help
☐ ______________________
☐ ______________________

Teamwork

☐ cooperates with group members
☐ shares tasks/tools appropriately among peers
☐ negotiates solutions to problems
☐ displays effective communication skills
☐ ______________________
☐ ______________________

Equipment and Materials

☐ selects appropriate equipment and materials
☐ handle/uses equipment and materials safely
☐ demonstrates concern for safe procedures/techniques
☐ cleans/maintains/stores equipment in a safe manner
☐ keeps work/study environment clean and organized
☐ advises of immediate hazards and necessary repairs
☐ ______________________
☐ ______________________

Environmental Ethics

☐ protects flora and fauna
☐ chooses environmentally friendly materials
☐ minimizes generation of waste materials
☐ follows accepted practices for disposing of wastes
☐ protects/manages water supply
☐ ______________________
☐ ______________________

ASSESSMENT CRITERIA: Letters of Support or Concern FORLET

RATING	ASSESSMENT CRITERIA
	The student:
4 3 2 1 0	**Preparation and Planning** ☐ identifies a specific issue regarding the forest environment ☐ talks to others in order to clarify ideas ☐ accesses basic in-school/community resources regarding the issue ☐ identifies appropriate individuals/agencies to contact ☐ establishes a position on the issue ☐ ________________
4 3 2 1 0	**Writing the Letter** ☐ clearly states a position on the issue and a rationale for adopting that position ☐ considers the implications of various approaches for dealing with the issue ☐ cites references to support information/views ☐ maintains an appropriate tone of communication ☐ requests a response to the letter ☐ uses correct grammatical and technical conventions ☐ demonstrates proofreading and editing skills ☐ ________________
4 3 2 1 0	**Critiquing the Response** ☐ identifies important elements of the response: – acknowledgement of support or concern – statement of position and rationale – reference to supporting information/views – comments regarding future options/alternatives ☐ assesses quality of the response based on: – logical development of ideas – quality/quantity of supporting information and views – tone of communication ☐ suggests possible improvements to the response and original letter ☐ ________________

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence.

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively.

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately.

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately.

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

N/A Not Applicable

REFLECTIONS/COMMENTS

TASK CHECKLIST FOR MAPPING FORMAP

TASK	OBSERVATION/RATING					
Preparation and Planning	4	3	2	1	0	N/A
Technical Components	4	3	2	1	0	N/A
Information Sharing	4	3	2	1	0	N/A
Collaboration and Teamwork	4	3	2	1	0	N/A

STANDARD IS 1 FOR INTRODUCTORY LEVEL MODULES, 2 FOR INTERMEDIATE LEVEL MODULES, AND 3 FOR ADVANCED LEVEL MODULES

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence.

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively.

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately.

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately.

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

N/A Not Applicable

TASK CHECKLIST

The student:

Preparation and Planning

☐ sets goals and follows instructions
☐ responds to directed questions and/or follows necessary steps to find answers
☐ uses time effectively
☐ accesses basic in-school/community information sources
☐ interprets and organizes information logically
☐ transfers and/or extrapolates data from print and visual sources to create maps
☐ ______________________________

Technical Components

☐ prepares an outline of the mapped area to scale
☐ provides an appropriate map title
☐ records relevant location data
☐ provides a map legend that explains:
  - map symbols
  - map scale
☐ organizes use of space; e.g.:
  - map size in relationship to paper size
  - use of borders
  - position of legend

Technical Components (continued)

☐ demonstrates appropriate use of colour, shading and/or patterns
☐ produces a document free of wrinkles and smudges
☐ maintains appropriate technical standards through proofreading and editing; e.g.:
  - spelling
  - legibility
☐ ______________________________

Information Sharing

☐ communicates map content through oral presentation
☐ demonstrates ability to use map overlays in presentation
☐ poses questions based on information provided in map
☐ ______________________________

Collaboration and Teamwork

☐ shares work appropriately among group members
☐ respects the views of others
☐ negotiates solutions to problems
☐ ______________________________

REFLECTIONS/COMMENTS

GUIDE TO CRITIQUING MEDIA INFORMATION FORMED

Student Name:	Date:
Media Source:	
Method of Presentation:	
Issue/Topic:	

GOALS/OBJECTIVES OF THE MEDIA PRESENTATION

SUMMARY OF INFORMATION PRESENTED (e.g., topic/issue, position taken, supporting detail, implications/consequences)

QUALITY/OBJECTIVITY OF INFORMATION PRESENTED (e.g., bias-balance, currency/reliability, logic/reasoning)

PERSONAL IMPACT OF MEDIA PRESENTATION

Yes	No	ASSESSING QUALITY/OBJECTIVITY
		The media presentation:
☐	☐	clearly describes a topic/issue/position taken with sufficient supporting detail
☐	☐	demonstrates bias-balance in the manner of presentation
☐	☐	makes reference to different points of view (e.g., social, economic, environmental)
☐	☐	distinguishes between fact and fiction/opinion/theory
☐	☐	references current and reliable sources for information and ideas
☐	☐	draws valid conclusions based on analysis/synthesis of information
☐	☐	

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence.

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively.

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately.

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately.

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

N/A Not Applicable

LOG/VERIFICATION OF VOLUNTEER WORK **FORLOG–VOL(a)**

Student Name: ______________________ Module: ______________ Supervisor: ____________________

Volunteer Service Provided: ______________ Date: __________

Volunteer Site/Location: ______________________________

Time Volunteered: ______________________________

Description of Volunteer Service:

(a) goals/tasks established by supervisor ______________________

(b) tasks completed by volunteer: ______________________

Observations/Insights Gained From Volunteer Work:

Comments: ______________________________

(Student's Signature)

(Supervisor's Signature) (Supervisor's Phone Number)

Volunteer Service Provided: ______________ Date: __________

Volunteer Site/Location: ______________________________

Time Volunteered: ______________________________

Description of Volunteer Service:

(a) goals/tasks established by supervisor ______________________

(b) tasks completed by volunteer: ______________________

Observations/Insights Gained From Volunteer Work:

Comments: ______________________________

(Student's Signature)

(Supervisor's Signature) (Supervisor's Phone Number)

STANDARD: The student completes all sections of the log/verification for five hours of volunteer work.

LOG/VERIFICATION OF VOLUNTEER WORK (PART I) FORLOG–VOL(b)

PREPARATION AND PLANNING	YES	NO	N/A
The student:			
• identifies personal and environmental goals for volunteer work	☐	☐	
• prepares a list of potential environmental, forest industry and/or professional organizations to contact regarding volunteer work	☐	☐	☐
• contacts an organization regarding desire to volunteer, sharing personal information through interview and/or resume	☐	☐	☐
• obtains satisfactory placement for volunteer work	☐	☐	
• establishes a schedule of dates and times for volunteer work	☐	☐	
• identifies and adheres to school policies/ procedures regarding off-campus activities	☐	☐	

VERIFYING AND REFLECTING	YES	NO	N/A
The student:			
• submits a log of tasks undertaken for each volunteer site and/or work experience (see Part II)	☐	☐	
• performs volunteer tasks in a satisfactory manner (see Part II)	☐	☐	
• provides a brief written summary of personal observations/impressions regarding the volunteer experience: – contribution of tasks undertaken to environmental stewardship – problems encountered and suggested solutions – recommendations regarding future volunteer experiences	☐	☐	

STANDARD IS 2 IN EACH APPLICABLE TASK AREA

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence.

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively.

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately.

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately.

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

N/A Not Applicable

REFLECTIONS / COMMENTS

LOG/VERIFICATION OF VOLUNTEER WORK (PART II) **FORLOG–VOL(b)**

STUDENT LOG OF ACTIVITIES

Student's Name: ____________________

Sponsoring Organization: ____________________

Supervisor's Name/Position: ____________________

Date(s) of Volunteer Work: ____________________

Time(s)/Duration of Volunteer Work: ____________________

____

Volunteer Tasks Undertaken:

____________________ ____________________
Student's Signature **Date**

VERIFICATION BY SUPERVISOR

The student:

- ☐ follows instructions and adheres to guidelines
- ☐ uses time effectively
- ☐ demonstrates concern for safe procedures and techniques
- ☐ anticipates and advises of potential hazards
- ☐ works cooperatively with other group members.

Supervisor's Comments:

____________________ ____________________
Supervisor's Signature **Date**

REFLECTION GUIDE FOR OUTDOOR EXPERIENCES FORREF–OUT

JOURNAL ENTRY:	#1	#2	#3	#4	#5
DATE:					
Individual/ Group Preparedness	4 3 2 1 0 N/A	4 3 2 1 0 N/A	4 3 2 1 0 N/A	4 3 2 1 0 N/A	4 3 2 1 0 N/A
Cooperation and Teamwork	4 3 2 1 0 N/A	4 3 2 1 0 N/A	4 3 2 1 0 N/A	4 3 2 1 0 N/A	4 3 2 1 0 N/A
Responsibility and Safety	4 3 2 1 0 N/A	4 3 2 1 0 N/A	4 3 2 1 0 N/A	4 3 2 1 0 N/A	4 3 2 1 0 N/A
Environmental Ethics	4 3 2 1 0 N/A	4 3 2 1 0 N/A	4 3 2 1 0 N/A	4 3 2 1 0 N/A	4 3 2 1 0 N/A
TOTAL:					

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence.

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively.

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately.

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately.

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

N/A Not Applicable

CRITERIA FOR REFLECTION

The student:

Individual/Group Preparedness

☐ sets goals and follows instructions accurately
☐ adheres to established timelines
☐ identifies/assembles outdoor gear appropriate to the task
☐ uses time effectively
☐ ____________________
☐ ____________________

Cooperation and Teamwork

☐ works with a range of peer members
☐ shares work appropriately among group members
☐ considers the ideas/suggestions of others
☐ ____________________
☐ ____________________

Responsibility and Safety

☐ selects and uses appropriate equipment/materials
☐ follows safe procedures/techniques
☐ anticipates and advises of potential hazards
☐ practises proper sanitation procedures
☐ ____________________
☐ ____________________

Environmental Ethics

☐ uses environmentally friendly materials
☐ picks up garbage and carries everything out that is carried in
☐ avoids ecologically sensitive areas
☐ demonstrates techniques for protecting water supply
☐ ____________________
☐ ____________________

REFLECTION GUIDE FOR ENVIRONMENTAL RESPONSIBILITY/CITIZENSHIP FORREF–ENV

JOURNAL ENTRY:	#1	#2	#3	#4	#5
DATE:					
Preparation and Planning	4 3 2 1 0 N/A	4 3 2 1 0 N/A	4 3 2 1 0 N/A	4 3 2 1 0 N/A	4 3 2 1 0 N/A
Comprehension and Analysis	4 3 2 1 0 N/A	4 3 2 1 0 N/A	4 3 2 1 0 N/A	4 3 2 1 0 N/A	4 3 2 1 0 N/A
Evaluation and Decision-Making	4 3 2 1 0 N/A	4 3 2 1 0 N/A	4 3 2 1 0 N/A	4 3 2 1 0 N/A	4 3 2 1 0 N/A
Presenting and Reporting	4 3 2 1 0 N/A	4 3 2 1 0 N/A	4 3 2 1 0 N/A	4 3 2 1 0 N/A	4 3 2 1 0 N/A
TOTAL:					

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence.

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively.

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately.

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately.

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

N/A Not Applicable

REFLECTION CRITERIA

The student:

Preparation and Planning

☐ sets goals and follow instructions accurately
☐ establishes a schedule of activities for completing each journal entry
☐ accesses in-school/community sources of information
☐ plans and uses time effectively

Comprehension and Analysis

☐ considers the impact of one or more personal attitudes, actions and/or lifestyles on the forest environment
☐ identifies relevant social, economic and/or environmental perspectives
☐ explains potential sources of conflict regarding personal attitudes, actions and/or lifestyle
e.g., Who? What? Where? Why?

Evaluation and Decision Making

☐ balances information and values
☐ demonstrates respect for and consider the views of others
☐ considers alternatives for environmental citizenship on the basis of their consequences and implications for the forest environment
☐ reflects on strengths of personal actions and lifestyle within the context of environmental responsibility, and suggest areas that need improvement

Presenting and Reporting

☐ uses correct grammatical convention and technical terms through proofreading/editing
☐ communicates information and ideas clearly in a logical sequence
☐ provides an introduction that describes the purpose of the journal entry
☐ states a conclusion based on a summary of information and ideas

ASSESSMENT CRITERIA: Proposal for Environmental Action **FORPRO**

PROPOSAL	RATIONALE	INTENDED OUTCOMES
1. **Personal Action**		
2. **Leadership Role**		

RATING SCALE

4 Demonstrates a thorough understanding of the need for action. Problems are solved independently in effective and creative ways. The rationale and outcomes are based on analysis of data and supported with sufficient detail.

3 Demonstrates an understanding of the need for action. Issues are effectively addressed in a self-directed manner. The rationale and outcomes are based on analysis of data and supported with some detail.

2 Demonstrates a general understanding of the need for action. Issues are addressed with guidance. The rationale and outcomes are based on limited data and detail.

1 Demonstrates partial understanding of the need for action. Attempts a proposal but the rationale and/or outcomes are general or unsupported.

0 Fails to understand the need for action or does not attempt a proposal.

DIRECTIONS

THE STUDENT PROVIDES TWO PROPOSALS FOR ENVIRONMENTAL ACTION - ONE BASED ON PERSONAL/INDIVIDUAL ACTION, THE OTHER INVOLVING A LEADERSHIP ROLE. EACH PROPOSAL TO BE SUPPORTED WITH A RATIONALE AND INTENDED OUTCOMES.

STANDARD

EACH PROPOSAL TO BE COMPLETED TO A STANDARD OF 1 IN INTRODUCTORY MODULES, 2 IN INTERMEDIATE MODULES, AND 3 IN ADVANCED MODULES.

ASSESSMENT CRITERIA: Diagrams and Technical Drawings FORDRA

TASK	OBSERVATION/RATING					
Preparation and Planning	4	3	2	1	0	N/A
Technical Components	4	3	2	1	0	N/A
Information Sharing	4	3	2	1	0	N/A
Collaboration and Teamwork	4	3	2	1	0	N/A

STANDARD IS 1 FOR INTRODUCTORY LEVEL MODULES, 2 FOR INTERMEDIATE LEVEL MODULES, AND 3 FOR ADVANCED LEVEL MODULES

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence.

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively.

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately.

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately.

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

N/A Not Applicable

TASK CHECKLIST

The student:

Preparation and Planning

- ☐ sets goals and follows instructions
- ☐ responds to directed questions and/or follows necessary steps to find answers
- ☐ uses time effectively
- ☐ accesses basic in-school/community information sources
- ☐ interprets and organizes information logically
- ☐ transfers and/or extrapolates data from print and visual sources to create a diagram/technical drawing
- ☐ ______
- ☐ ______

Technical Components

- ☐ selects and uses appropriate drawing instruments and tools
- ☐ prepares an accurate outline of the theme to scale
- ☐ adds detail to the theme as required to ensure recognition and realism
- ☐ organizes use of space; e.g.:
  - diagram/technical drawing in relation to paper size
  - use of borders
  - position of labels

Technical Components (continued)

- ☐ accurately labels diagram/technical drawing components
- ☐ provides an appropriate title for the diagram/technical drawing
- ☐ demonstrates appropriate use of colour, shading and/or patterns
- ☐ produces a document free of wrinkles and smudges
- ☐ maintains appropriate technical standards through proofreading and editing; e.g.:
  - spelling
  - readability
- ☐ ______
- ☐ ______

Information Sharing

- ☐ communicates content of diagram/technical drawing through oral presentation
- ☐ demonstrates ability to use overlays in presentation
- ☐ poses questions based on information provided in the diagram/technical drawing
- ☐ ______
- ☐ ______

Collaboration and Teamwork

- ☐ shares work appropriately among group members
- ☐ respects the views of others
- ☐ negotiates solutions to problems
- ☐ ______
- ☐ ______

REFLECTIONS/COMMENTS

ASSESSMENT CRITERIA: Flow Charts FORFLO

TASK	OBSERVATION/RATING					
Preparation and Planning	4	3	2	1	0	N/A
Technical Components	4	3	2	1	0	N/A
Information Sharing	4	3	2	1	0	N/A
Collaboration and Teamwork	4	3	2	1	0	N/A

STANDARD IS 1 FOR INTRODUCTORY LEVEL MODULES, 2 FOR INTERMEDIATE LEVEL MODULES, AND 3 FOR ADVANCED LEVEL MODULES

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence.

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively.

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately.

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately.

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

N/A Not Applicable

TASK CHECKLIST

The student:

Preparation and Planning

☐ sets goals and follows instructions
☐ responds to directed questions and/or follows necessary steps to find answers
☐ uses time effectively
☐ accesses basic in-school/community information sources
☐ interprets and organizes information logically
☐ transfers and/or extrapolates data from print and visual sources to create a flow chart
☐ ____________________
☐ ____________________

Technical Components

☐ prepares an outline of steps/processes in proper sequence and order
☐ organizes use of space in relation to paper size
☐ selects and uses appropriate drawing instruments and tools
☐ creates a flow chart that:
  – has a definite beginning and end
  – clearly indicates the sequencing of steps/processes
☐ provides arrows to indicate correct sequence of steps/processes

Technical Components (continued)

☐ labels flow chart components as required
☐ provides an appropriate title for the flow chart
☐ demonstrated appropriate use of colour, shading and/or patterns
☐ produces a document free of wrinkles and smudges
☐ maintains appropriate technical standards through proofreading and editing; e.g.:
  – spelling
  – legibility
☐ ____________________
☐ ____________________

Information Sharing

☐ communicates content of flow chart through oral presentation
☐ demonstrates ability to use flow chart overlays in presentation
☐ poses questions based on information provided in the flow chart
☐ ____________________
☐ ____________________

Collaboration and Teamwork

☐ shares work appropriately among group members
☐ respects the views of others
☐ negotiates solutions to problems
☐ ____________________
☐ ____________________

REFLECTIONS/COMMENTS

OBSERVATION CHECKLIST FOR FIELD-BASED INVESTIGATIONS		FOROBS

Student Name:	Module:	Date:
Destination:		
Contact Person:		
Title/Position of Contact Person:		

PURPOSE OF TRIP (Teacher Defined)

STUDENT EXPECTATIONS (What do you expect to observe/learn?)

ACTUAL OBSERVATIONS (What did you actually observe/learn?)

APPLICATIONS OF SCIENCE AND TECHNOLOGY

REFLECTION ON FIELD INVESTIGATION (What did you find most interesting? least interesting?)

OBSERVED CAREERS

Career #1:
Title:
Education Requirements:
Salary Range:
Pros:
Cons:

Career #2:
Title:
Education Requirements:
Salary Range:
Pros:
Cons:

Career #3:
Title:
Education Requirements:
Salary Range:
Pros:
Cons:

Would any of the observed careers appeal to you? Why or why not?

SUMMATIVE CHECKLIST

(to be completed by teacher/supervisor)

The student:

- ☐ identifies trip goals and follows instructions accurately
- ☐ adheres to established itinerary/timelines
- ☐ demonstrates appropriate use of equipment, supplies and/or clothing
- ☐ adheres to acceptable safety standards and behavioural expectations as established by school policy
- ☐ accesses resources available on site
- ☐ uses effective questioning techniques to gather information
- ☐ interprets and records information accurately
- ☐ follows directions/procedures indicated by tour guide and/or as established by industry policy while on site
- ☐ completes all sections of the observation checklist for each field-based investigation.
- ☐
- ☐

KNOWLEDGE/APPLICATION ASSESSMENT: Significance of Forests FOR1010–1

Assessment Criteria and Conditions:

- identifying and explaining six or more ways in which local forests (regional or provincial) have:
  - social and cultural significance (e.g., recreational, spiritual, aesthetic, medicinal)
  - economic significance (e.g., employment, product export, tourism, subsistence, tax base)
  - environmental significance (e.g., air, water and soil cycles).

Suggested Reference(s):

- *Alberta's Focus on Forests*
- *Woodlot Management Guide for the Prairie Provinces*
- *Our Growing Resource*

STANDARD: **Respond to a standard of 1 on the rating scale.**

Rating Scale

The student:

4 meets project/task objectives in a self-directed manner. Provides explanations and critical judgements based on a superior knowledge base. Demonstrates an understanding of relevant concepts and related issues.

3 meets project/task objectives in a self-directed manner. Provides explanations and comparisons of relevant concepts using more precise terminology. Requires little or no prompting.

2 meets project/task objectives with limited assistance in planning and in selecting and using resources. Applies knowledge of concepts in different situations using correct terminology. Requires occasional prompting.

1 completes task as directed, demonstrating basic skills/completeness by following a guided course of action. Uses simple recall to demonstrate basic knowledge of concepts. Requires prompting.

0 does not complete the task, or is unable to provide a suitable response.

N/A Not Applicable

Background Information

See *Alberta's Focus on Forests*:

- Activity 1.4: How Forests Affect the Environment
- Activity 4.2: Products from Canada's Forests
- Activity 5.1: Forest Values.

See *Woodlot Management Guide for the Prairie Provinces*, page i-6: Potential Benefits from Woodlots:

- Cash Returns
- Personal Use
- Insurance
- Erosion Control
- Windbreaks and Crop Enhancement
- Winter Shelter
- Landscape Aesthetics
- Wildlife Habitat
- Moisture Management and Snow Catching
- Environmental Aspect.

Sample Questions/Activities

1. **Describe six or more ways in which local forests have social and cultural significance;** e.g.:
   - recreational
   - spiritual
   - aesthetic
   - medicinal
   - community dependence.
2. **Describe six or more ways in which local forests have economic significance;** e.g.:
   - employment
   - product export
   - tourism
   - subsistence
   - tax base
3. **Describe six or more ways in which local forests have environmental significance;** e.g.:
   - wildlife and fisheries habitat
   - watershed protection and maintenance
   - water, air and soil quality
   - maintenance of ecosystems

SAMPLE TIMELINE: Forestry in North America FOR1010–2

DATE	EVENT
6000 BC	Forest cover gradually regenerates over most of Canada following the ice age. Trees are used by native people as a source of food, heat, boat and home building material.
3600 BC	Earliest use of paper, a papyrus document.
105	T'sai Lun invents paper using silk, bark and hemp.
1150	Moors introduce paper to Europe.
1604	Samuel de Champlain establishes one of the earliest European settlements in Canada, on an island in the Saint Croix River.
1607	European settlers begin to arrive, forests are cleared for agriculture, lumber and fuel.
1650	First sawmills appear along the St. Lawrence River and in Atlantic Canada.
1719	A French physicist, Reaumur, states that paper can be made from the fibres of plants, including trees.
1763	American Revolution restricts British access to New England timber supply. Britain begins to exploit Atlantic Canada forests for masts and spars.
1793	Napoleonic Wars restrict British access to Baltic timber. This initiates Canada's timber trade with Britain, an industry that continues to grow throughout the 19th century.
1799	Nicolas Robert of France patents the first papermaking machine. Until this time, paper has been made entirely by hand, sheet by sheet.
1803	First Canadian paper mill built at St. Andrew's, Lower Canada (Quebec), by Walter Ware and Benjamin Wales, two New Englanders. They manufacture writing, printing and wrapping papers.
1817	First of many paper mills in Lower Canada (Quebec), built by Artemus Jackson.
1819	First paper mill in the Maritimes built by Anthony Holland to supply his newspaper with paper.
1843	Paper is still manufactured largely from linen and cotton rags. But interest in wood as a possible raw material is increasing. Friedrich Keller invents the process for manufacturing groundwood pulp.
1848	U.S. timber merchants and lumbermen begin setting up business in Canada, building mills and importing American workers. By the end of the century, the value of American lumber trade equals that of Britain.
1849	First sawmills appear on Vancouver Island, just outside of Victoria.
1850	Pine and oak timber is in great demand for export.
1851	The Englishmen, Hugh Burgess and Charles Watt, invent a process for manufacturing pulp by cooking wood chips in chemicals. It is called the soda process and uses caustic soda and lye.
1860	Lumber exports begin from western Canada, mainly to South America, Australia and San Francisco.
1869	First groundwood pulp produced commercially in Canada at Valleyfield, Quebec by Alexander Buntin.
1890	First tissue machine in Canada installed by E.B. Eddy at Hull, Quebec.
1891	British Columbia prohibits exports of pulpwood from crown lands.
1899	Elihu Stewart, the first Dominion Forester, is hired.

SAMPLE TIMELINE: Forestry in North America (continued) FOR1010-2

DATE	EVENT
1900	As the 20th century begins, papermaking in Canada is still a small industry serving domestic needs.
1907	First forestry school in Canada opens at the University of Toronto.
1912	The first forest fire protection association is formed in St. Maurice, Quebec.
1914	The east coast lumber industry begins to decline. The best timber is depleted and Britain reestablishes links with Baltic lumber merchants.
1916	Demands on forests during World War I reduce available timber to low levels.
1918	Canada becomes the world's largest exporter of pulp and paper.
1919	For the first time in Canada, aircraft are used for fire patrol and photographic mapping.
1924	Protectionism in the U.S. closes the American market to Canadian timber.
1926	Canada's newsprint production exceeds that of the U.S.
1930	The Great Depression reduces pulp and paper production by one third.
1935	West coast forest industry gradually expands to comprise half of the total Canadian lumber production.
1939	World War II stimulates a substantial increase in the production of forest products.
1945	Postwar exports of lumber, pulp and paper rise sharply.
1946	The first bleach kraft pulp mill designed by Howard Rapson and Morris Wayman is built and Temiscaming, Quebec.
1949	Ontario Department of Lands and Forests uses water bombers to fight forest fires.

DATE	EVENT
1950	The gas-powered chainsaw comes into wide use in Canadian forests. The wheeled skidder called the Bonnard prehauler is introduced
1960	Government and industry increase conservation efforts; the amount of trees cut now equal the amount grown.
1964	A large expansion of the Canadian forest industry occurs. New mills are built in every region of Canada, particularly British Columbia.
1966	The timber quota system is introduced in Alberta to provide the forest industry with long term timber inventories.
1975	The Forest Engineering Research Institute of Canada is established.
1979	The Canadian pulp and paper industry produces 20 million tonnes of pulp, paper and paperboard valued at $8 billion.
1987	More than 800 million seedlings are planted in an effort to make Canada's forest resource healthier and more productive.
1988	Valued at $14 billion, pulp and paper remains Canada's most important manufacturing sector.
1990	Biodiversity in the forest becomes a major issue in Canada and the world.
19__	Canadian society insists on environmental auditing of forestry operations.

RESEARCH PROCESS: Impacts on the Forest Resource FOR1010–3

TASK	OBSERVATION/RATING					
Preparation and Planning	4	3	2	1	0	N/A
Information Gathering and Processing	4	3	2	1	0	N/A
Content	4	3	2	1	0	N/A
Collaboration and Teamwork	4	3	2	1	0	N/A
Information Sharing	4	3	2	1	0	N/A

STANDARD IS 1 IN EACH APPLICABLE TASK

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence.

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively.

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately.

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately.

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

N/A Not Applicable

TASK CHECKLIST

The student:

Preparation and Planning

☐ sets goals and follows instructions accurately
☐ adheres to established timelines
☐ responds to directed questions and follows necessary steps to find answers
☐ uses time effectively

Information Gathering and Processing

☐ accesses basic in-school/community information sources
☐ uses one or more information-gathering techniques
☐ interprets and organizes information into a logical sequence
☐ records information accurately, using correct technical terms
☐ distinguishes between fact and fiction/opinion/theory
☐ responds to feedback when current approach is not working

Content

☐ describes the impact of personal actions and lifestyle on the forest resource; e.g.:
  – consumer choices
  – recreational patterns
☐ prepares an inventory of household materials used on a daily basis that are derived from the forest resource

Content (continued)

☐ distinguishes between "wants" and "needs" as they relate to consumptive practices
☐ explains how product marketing and promotion may affect the forest resource; e.g.:
  – media exaggeration
  – use of environmentally friendly products
☐ compares and contrasts the "conservation ethic" and "preservation ethic" with reference to the impact of each on the forest resource
☐ ____________________
____
☐ ____________________
____

Collaboration and Teamwork

☐ cooperates with group members
☐ shares work appropriately among group members

Information Sharing

☐ demonstrates effective use of one or more communication media:
e.g., written, oral, audio-visual
☐ communicates information in a logical sequence
☐ uses correct grammatical conventions and technical terms
☐ cites three or more basic information sources

REFLECTIONS/COMMENTS:

LAB INVESTIGATIONS: Factors Affecting Plant Growth FOR1020–1

TASK	OBSERVATION/RATING					
Management	4	3	2	1	0	N/A
Teamwork	4	3	2	1	0	N/A
Equipment and Materials	4	3	2	1	0	N/A
Investigative Techniques	4	3	2	1	0	N/A

STANDARD IS 1 IN EACH APPLICABLE TASK

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence.

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively.

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately.

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately.

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

N/A Not Applicable

TASK CHECKLIST

The student:

Management
- ☐ prepares self for task
- ☐ organizes and work in an orderly manner
- ☐ carries out instructions accurately
- ☐ uses time effectively

Teamwork
- ☐ cooperates with group members
- ☐ shares work appropriately among group members

Equipment and Materials
- ☐ selects and uses appropriate equipment/materials
- ☐ follows safe procedures/techniques
- ☐ weighs and measures accurately
- ☐ returns clean equipment/materials to storage areas

Investigative Techniques
- ☐ gathers and applies information from at least one source
- ☐ makes predictions that can be tested regarding factors affecting plant growth; e.g.:
  - – temperature
  - – moisture
  - – soil characteristics
- ☐ sets up and conducts experiments to test predictions
- ☐ distinguishes between manipulated/responding variables
- ☐ obtains results that can be used to determine if some aspect of the prediction is accurate
- ☐ summarizes important experimental outcomes regarding factors affecting plant growth
- ☐ applies experimental results in explaining the distribution of forests in Alberta
- ☐ ______________________________
  ____

REFLECTIONS/COMMENTS:

KNOWLEDGE/APPLICATION ASSESSMENT: Growth and Distribution of Forests FOR1020–2

Assessment Criteria and Conditions:

- explaining ways in which climate and land form affect the growth and distribution of forests.

Suggested Reference(s):

- *Alberta's Focus on Forests*
- *Investigating Terrestrial Ecosystems*
- *Native Trees of Canada*

STANDARD: Respond to a standard of 1 on the rating scale.

Rating Scale

The student:

4 meets project/task objectives in a self-directed manner. Provides explanations and critical judgements based on a superior knowledge base. Demonstrates an understanding of relevant concepts and related issues.

3 meets project/task objectives in a self-directed manner. Provides explanations and comparisons of relevant concepts using more precise terminology. Requires little or no prompting.

2 meets project/task objectives with limited assistance in planning and in selecting and using resources. Applies knowledge of concepts in different situations using correct terminology. Requires occasional prompting.

1 completes task as directed, demonstrating basic skills/completeness by following a guided course of action. Uses simple recall to demonstrate basic knowledge of concepts. Requires prompting.

0 does not complete the task, or is unable to provide a suitable response.

N/A Not Applicable

Background Information

See *Alberta's Focus on Forests*:

- Activity 3.1: A Lot Depends on Location
- Activity 3.4: Forests: Thriving or Declining.

See *Investigating Terrestrial Ecosystems*:

- Chapter 6: Adaptations of Organisms to Light and Soil
- Chapter 7: Weather, Climate and Biomes.

Sample Questions/Activities

1. **Explain ways in which climatic factors affect the growth of trees;** e.g.:
   - temperature
   - moisture
2. **Explain ways in which land form factors affect the growth of trees;** e.g.:
   - topography
   - soil characteristics
3. **Integrate information about climatic and land form factors to explain species distribution within forest regions.**
4. **Given a natural region of Alberta or Canada, suggest five or more reasons for the distribution of trees within that region.**

MUSEUM CONSERVATION RULES FOR LEAF/TWIG COLLECTION FOR1020–3

ASSESSMENT CRITERIA Each specimen in the collection to be assessed according to the following criteria:	**RATING SCALE**			
	0	**1**	**2**	**3**
1. Completeness • specimen must include typical needles/leaves, twig and terminal bud • cone, fruit or seed to be included where feasible • minimum size of specimen is 15 cm in length	Atypical foliage No twig or bud No cone or fruit	No twig or bud Sample too small No cone or fruit	All components present Size at minimum No cone or fruit	All components present Size above minimum Cone/fruit included
2. Pressing: • specimen to be flattened so that the undersides of some needles/leaves face upward • no folding or bending of tissue to be evident.	Foliage not flat Underside of foliage not visible Substantial folding of tissue	Foliage flat Underside of foliage not visible Significant folding of tissue	Foliage flat Underside of some foliage faces upward Minor folding of tissue	Foliage Flat Underside of some foliage faces upward All tissue laying flat
3. Mounting: • dried specimens are attached to Bristol board with white glue or Gum Arabic • conifers may be placed in Ryker mounts • specimen must occupy central position on mounting sheet (or in Ryker mount) • orientation vertical or at 45° to vertical (terminal bud to top).	Scotch tape Horizontal or downward orientation Smears evident	White glue Horizontal or downward orientation Minor smears or excess glue	White glue Vertical or upward orientation Excess/insufficient glue used	White glue Vertical or upward orientation Sheet clear of smears, excess glue
4. Labelling: family name scientific name common name geographic location where collected habitat name of collector date of collection	Incomplete information Incorrect sequence for more than 2 items	Habitat or location missing 1-2 items out of sequence	Complete information 1-2 items out of sequence	Complete information Correct sequence
5. Identification: • must include common name, as well as species, genus and family names.	More than 2 categories incorrect (family, genus, species, common name)	2 of 4 categories wrong	Correct to genus only	Correct to species

STANDARD IS 2 FOR EACH SPECIMEN IN THE COLLECTION

BEST COPY AVAILABLE

KNOWLEDGE/APPLICATION ASSESSMENT: Hazards in the Forest Environment FOR1040–1

Assessment Criteria and Conditions:

- identifying five or more physical hazards that may be imposed by a forest environment, and explaining appropriate steps to take in avoiding/preventing and responding/dealing with each hazard

Suggested Reference(s):

- *National Occupational Standards for Outdoor Guide*
- *JFW Green Tree Trailblazer Leader Manual*

STANDARD: Respond to a standard of 1 on the rating scale.

Rating Scale

The student:

4 meets project/task objectives in a self-directed manner. Provides explanations and critical judgements based on a superior knowledge base. Demonstrates an understanding of relevant concepts and related issues.

3 meets project/task objectives in a self-directed manner. Provides explanations and comparisons of relevant concepts using more precise terminology. Requires little or no prompting.

2 meets project/task objectives with limited assistance in planning and in selecting and using resources. Applies knowledge of concepts in different situations using correct terminology. Requires occasional prompting.

1 completes task as directed, demonstrating basic skills/completeness by following a guided course of action. Uses simple recall to demonstrate basic knowledge of concepts. Requires prompting.

0 does not complete the task, or is unable to provide a suitable response.

N/A Not Applicable

Background Information

See *National Occupational Standards for Outdoor Guide*:

Section F - Safety

- 1.1: avoid dangerous situations with wildlife
- 1.2: prepare for weather and seasonal conditions
- 1.5: follow guidelines for travel safety

Section G - Survival

- 1.1: outline requirements for survival and first-aid kits
- 1.2: follow emergency plan
- 1.3: set up emergency shelter
- 2.1: signal for help
- 2.2: use two-way radio
- 3.1: identify water and food needs for survival
- 3.2: ensure safe supply of water and food

Sample Questions / Activities

1. **Explain steps to take in identifying, assessing, avoiding and/or responding to physical hazards imposed by the forest environment;** e.g.:
   - particular terrain and conditions, including avalanche, lake and river ice, and bush travel
   - wildlife that may be encountered, including bears, bees, ticks, non-edible plants
   - changes in weather conditions that may affect personal and group safety.
2. **Explain steps to take in identifying, assessing, avoiding and/or responding to physiological and psychological factors often associated with outdoor experiences in the forest;** e.g.:
   - dealing with hypothermia, frostbite and dehydration
   - understanding fatigue and when not to move
   - coping with adversities, such as getting lost or hurt.
3. **List/explain/demonstrate necessary steps to take in emergency and survival situations in the forest;** e.g.:
   - what to do if lost or separated from the group
   - first-aid and emergency response to injury
   - construction of emergency shelters
   - how to gather food from edible plants
   - en route organizational strategies, including lead and sweep, regrouping procedures, pacing.

SAMPLE ASSESSMENT ITEMS: Woods Survival 1 FOR1040–2

MULTIPLE CHOICE:

1. Bob's toes are numb after spending all day outdoors at -25°C. He gets in his truck and takes off his boots. All his toes are white and hard. Bob should:
   a) turn the heater on high and stick his toes in the hot air
   [✓ b)] let his feet warm up slowly
   c) rub snow on the affected area
   d) pour the hot coffee from his thermos over his toes to warm them up quickly.

2. To avoid frostbite one should:
   a) always wear a face mask
   b) don't go out when colder than -20°C
   [✓ c)] evaluate the weather and dress accordingly
   d) always dress for -40°C weather.

3. If you were wet and started to panic in the woods, the best way to deal with the fear is:
   a) run very fast for 10 minutes because physical activity removes fear
   [✓ b)] force yourself to sit down and think about the situation calmly
   c) let the panic happen and deal with the situation after
   d) none of the other choices.

4. If you were planting trees in a hot open cutover with no shade, you should:
   a) drink a litre of water once every 3 hours and wear a hat
   b) drink a little water every 20 minutes or so and not wear a hat
   c) drink a litre of water once every 3 hours and not wear a hat
   [✓ d)] drink a little water every 20 minutes or so and wear a hat.

5. On a cold late fall day with a stiff wind blowing, your partner falls into a river. He goes through some rapids and is in the river for five minutes before you drag him out. You should:
   a) tell him to walk with you and let the wind dry him off
   [✓ b)] build a fire to dry him off
   c) make him take off his clothes, build a fire and warm him up
   d) continue working, it will take his mind off his wet clothes.

WRITTEN RESPONSE:

1. Describe "hypothermia" and list three factors that cause it.

   Descriptive Criteria: *shivering, loss of coordination, loss of awareness, slowing down, withdrawal (personality change), speech difficulty*
   Causes: *fatigue, exhaustion, hypohydration, inappropriate dress, injury*

2. Survival may depend on the person as well as the situation. List eight personality requirements of survival.

   Survival may depend on personality as well as the nature of the danger, weather, terrain, or emergency. Whether fear will lead to panic or act as a spur to greater sharpness, whether fatigue will overcome or leave a person able to take the necessary action to survive, depend on the person as well as the situation. Qualities in people that are important to survival are:
   - *can make up one's mind*
   - *can improvise*
   - *can live in solitude*
   - *can adapt to new situations*
   - *can remain, calm and collected*
   - *can hope for the best but prepare for the worst*
   - *has patience*
   - *can accept hardship*
   - *can understand the other person.*

3. You are in an outdoor survival situation with no contact for outside assistance. What procedure would you use to obtain your food and water requirements in a:

   a. mid-winter forested area
   b. summer forested area
   c. summer area above the timberline.

WRITTEN RESPONSE (continued):

4. Describe strategies that may be effective in coping with pain in survival situations.

   Pain is Nature's way of making you pay attention to something that is wrong with you. But Nature also has ways of holding off pain if you are too busy doing something else to pay attention to the injury right then. Pain may go unnoticed if your mind is occupied with plans for survival. On the other hand, once given in to, pain will weaken the drive to survive. Pain can get the best of you if you let it, even if it isn't serious or prolonged. A special effort must be made to keep hopes up and to keep working.

5. How does fatigue work to lessen a person's chances of survival? Describe strategies for minimizing fatigue in outdoor situations.

   Even a very moderate amount of fatigue can materially reduce mental ability. Fatigue can make you careless—it becomes increasingly easy to adopt the feeling of just not caring. This is one of the biggest dangers in survival. The confused notion that fatigue and energy expenditure are directly related may be responsible for many deaths in survival situations. Certainly there is a real danger of over-exertion, but fatigue may actually be due to hopelessness, lack of a goal, dissatisfaction, frustration or boredom. Fatigue may represent an escape from a situation which has become too difficult. If you recognize the dangers of a situation, you can often summon the strength to go on.

6. Boredom and loneliness are two often unexpected challenges in survival situations. Describe strategies for coping with these challenges.

   Boredom and loneliness are two of the toughest enemies of survival. They are dangerous mainly because they are unexpected. When nothing happens, when something is expected and doesn't come off, when you must stay still, quiet and alone, these feelings creep up on you.

7. Describe strategies for coping with cold, thirst and hunger in survival situations.

Standard: Response indicating 80% mastery

213

TASK CHECKLIST: Woods Survival 1 **FOR1040–3**

PLANNING, ASSEMBLING AND TRANSPORTING GEAR

The student:

- ☐ prepares a three-day camping menu for self that addresses:
  - ☐ expected caloric output
  - ☐ all food groups included in the *Canada's Food Guide for Healthy Eating*
  - ☐ concerns related to food spoilage
  - ☐ provisions for emergency
- ☐ assembles and packs gear for a trip in an appropriate manner:
  - ☐ addresses weight restrictions
  - ☐ makes efficient use of space
  - ☐ packs food to prevent spoilage and minimize odour
- ☐ safely transports gear by human conveyance (e.g., backpack, sled) a minimum distance of 3 kilometres
- ☐
- ☐
- ☐

OUTDOOR TOOLS AND EQUIPMENT

The student:

- ☐ follows safe procedures for the use of knives:
  - ☐ ensures good condition prior to use
  - ☐ demonstrates safe use/appropriate care
  - ☐ follows safe procedures for storing and carrying
  - ☐ uses correct sharpening techniques
- ☐ follows safe procedures for the use of axes:
  - ☐ ensures good condition prior to use
  - ☐ demonstrates safe use/appropriate care
  - ☐ follows safe procedures for storing and carrying
  - ☐ uses correct sharpening techniques
- ☐ follows safe procedures for the use of saws:
  - ☐ ensures good condition prior to use
  - ☐ demonstrates safe use/appropriate care
  - ☐ follows safe procedures for storing and carrying
  - ☐ uses correct sharpening techniques
- ☐ follows safe procedures for the use of shovels:
  - ☐ ensures good condition prior to use
  - ☐ demonstrates safe use/appropriate care
  - ☐ follows safe procedures for storing and carrying
  - ☐ uses correct sharpening techniques

OUTDOOR TOOLS AND EQUIPMENT (continued)

The student:

- ☐ follows safe procedures for the use of lanterns:
  - ☐ ensures sufficient fuel/air intake
  - ☐ removes extra fuel from area before lighting
  - ☐ allows spilled fuel to evaporate prior to lighting
  - ☐ follows correct lighting procedures
  - ☐ places lit lantern in safe location
- ☐ follows safe procedures for the use of stoves:
  - ☐ ensures sufficient fuel/air intake and adequate ventilation
  - ☐ removes extra fuel from area prior to lighting
  - ☐ allows any spilled fuel to evaporate prior to lighting
  - ☐ follows correct lighting procedures
  - ☐ follows correct shut-down/post-use procedures
- ☐
- ☐

OUTDOOR FIRES

The student:

- ☐ checks the location and supply of extinguishing materials
- ☐ uses natural materials (e.g., rocks) to control fire spread
- ☐ removes vegetation matter from base of fire
- ☐ takes wind into consideration when choosing fire location
- ☐ establishes a structure/method for supporting cooking utensils
- ☐ starts the fire using fine fuels (e.g., grass, twigs) rather than gas
- ☐ constructs a fire of appropriate size, using only drift wood or dead fall for fuel
- ☐ ensures fire is completely extinguished when finished
- ☐

CONSTRUCTING OUTDOOR SHELTERS

The student:

- ☐ identifies type of shelter that will best protect from the elements

CONSTRUCTING OUTDOOR SHELTERS (continued)

- ☐ selects an appropriate location for shelter, considering water, fire and signalling needs
- ☐ selects a location protected from wind, and away from dead or single trees
- ☐ demonstrates two or more basic shelter-building techniques that involve the use of materials and/or natural structures available in the outdoors; e.g.:
  - ☐ fallen tree shelter
  - ☐ lean-to shelter
  - ☐ snow cave shelter
- ☐ constructs shelter demonstrating least possible impact on the environment
- ☐ demonstrates appropriate use of tools, equipment and safety devices
- ☐

HYGIENE AND SANITATION

The student:

- ☐ plans for potable water supply
- ☐ demonstrates appropriate water purification techniques
- ☐ explains appropriate location and construction of latrines

HYGIENE AND SANITATION (continued)

- ☐ establishes methods of disposing of waste water and garbage
- ☐
- ☐

STANDARD IS 2 IN EACH APPLICABLE TASK

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence.

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively.

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately.

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately.

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

N/A Not Applicable

PORTFOLIO ASSESSMENT: Maps Used in Forestry FOR1050–1

TASK	OBSERVATION/RATING					
Allocating Time and Materials	4	3	2	1	0	N/A
Building the Portfolio	4	3	2	1	0	N/A
Presenting and Critiquing	4	3	2	1	0	N/A

STANDARD IS 1 IN EACH APPLICABLE TASK

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence.

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively.

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately.

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately.

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

N/A Not Applicable

TASK CHECKLIST

The student:

Allocating Time and Materials

☐ develops and follows a schedule of activities for preparing a portfolio of maps and aerial photographs used in forestry
☐ uses personal initiative to formulate questions and find answers; identifies parameters within which problems must be solved
☐ accesses a range of relevant in-school and community resources
☐ shares information with others for feedback and collaboration
☐ plans and uses time effectively
☐ assesses and refines approach to task and project status based on feedback and reflection

Building the Portfolio

☐ constructs four or more different types of maps used in forestry; e.g.:
  – base map
  – topographic/contour map
  – soil type map
  – forest stand map
☐ identifies characteristics and applications of each type of map included in the portfolio
☐ develops a one-page report on the National Topographic Grid System and its application in providing legal land descriptions
☐ displays one or more examples of aerial photographs

Building the Portfolio (continued)

☐ explains the purpose and techniques of aerial photography, and applications of different types of film used
☐ provides a summary of current information-gathering technologies and their applications in mapping; e.g.:
  – satellite imagery
  – Global Positioning Systems (GPS)
☐ ______________________________
____

Presenting and Critiquing

☐ demonstrates effective use of two or more communication media in presenting the portfolio: *e.g., written, oral, audio-visual*
☐ communicates ideas in a logical sequence with sufficient supporting detail
☐ maintains acceptable grammatical and technical standards
☐ provides an introduction that describes the purpose and scope of the portfolio
☐ relates final outcomes and products to original purpose, and identifies strengths and areas for improvement
☐ ______________________________
____
☐ cites five or more relevant information sources
☐ conducts collaborative assessment of processes used and outcomes achieved

REFLECTIONS/COMMENTS:

ALLOCATING TIME AND MATERIALS

The student:

- ☐ develops and follows a schedule of activities for each orienteering task
- ☐ selects and uses appropriate equipment and materials
- ☐ uses appropriate safety devices; e.g.:
  - ☐ protective clothing
  - ☐ protective eye wear
  - ☐ hard hats
- ☐ recognizes potential hazards and takes steps to eliminate/avoid them
- ☐ critically examines task performance, identifying strengths and areas that need improvement

BASIC COMPASS AND MEASUREMENT SKILLS

The student:

- ☐ reads and interprets maps and aerial photographs used in forestry; e.g.:
  - ☐ legend and symbols
  - ☐ scale
  - ☐ colours
  - ☐ contour lines
- ☐ constructs a mental image of a forested area from information conveyed through maps and aerial photographs
- ☐ orients a forestry map through inspection of surroundings

BASIC COMPASS AND MEASUREMENT SKILLS (continued)

The student:

- ☐ orients a forestry map using a compass:
  - ☐ places compass on map with edge along desired line of travel
  - ☐ rotates the capsule until the "N" on the compass dial points to true north on the map
  - ☐ checks to ensure that north-south lines are parallel with the map's meridians
  - ☐ reads the bearing at the top of the compass
- ☐ obtains a bearing from a map using a forestry compass:
  - ☐ sets the compass for the desired bearing of travel
  - ☐ holds the compass level and turns body until north end of the needle aligns with 0 degrees (compass north)
  - ☐ walks in direction of bearing, citing landmarks and checking course
- ☐ measures direction using a Douglas protractor
- ☐ applies knowledge of the National Topographic Grid System in locating a parcel of forested land; e.g.:
  - ☐ given its legal land description, locates a specific parcel of land on a map
  - ☐ given a specific parcel of land on a map, identifies its legal land description
- ☐ estimates/calculates distance and area on a forestry map
- ☐

STANDARD IS 1 IN EACH APPLICABLE TASK

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence.

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively.

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately.

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately.

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

N/A Not Applicable

REFLECTIONS/COMMENTS

KNOWLEDGE/APPLICATION ASSESSMENT: Reading and Interpreting Forest Maps FOR1050–3

Assessment Criteria and Conditions:

- describing topography and forest cover for a given area based on information gathered from:
  - an aerial photograph and corresponding parts of a forest type map
  - two or more different types of aerial photographs (e.g., black and white, colour, infrared, satellite imagery)

Suggested Reference(s):

- *Managing the Forest*

STANDARD: Respond to a standard of 1 on the rating scale.

Rating Scale

The student:

4 meets project/task objectives in a self-directed manner. Provides explanations and critical judgements based on a superior knowledge base. Demonstrates an understanding of relevant concepts and related issues.

3 meets project/task objectives in a self-directed manner. Provides explanations and comparisons of relevant concepts using more precise terminology. Requires little or no prompting.

2 meets project/task objectives with limited assistance in planning and in selecting and using resources. Applies knowledge of concepts in different situations using correct terminology. Requires occasional prompting.

1 completes task as directed, demonstrating basic skills/completeness by following a guided course of action. Uses simple recall to demonstrate basic knowledge of concepts. Requires prompting.

0 does not complete the task, or is unable to provide a suitable response

N/A Not Applicable

Background Information

See *Managing the Forest*:

Maps
- Topographic Map Interpretation
- Contour Mapping

Air Photographs
- Photo Mosaic
- Drainage Patterns
- Stereogram

Sample Questions/Activities

1. **Read and interpret maps and aerial photographs, explaining information conveyed through:**
   - legend and symbols
   - scale
   - colours
   - contour lines.
2. **Construct a "mental image" of land terrain as conveyed through a map.**
3. **Use maps to estimate and calculate:**
   - distance
   - area.
4. **Demonstrate applications of aerial photographs in the stereoscopic viewing of topographic features.**
5. **Compare details of forest type maps and aerial photographs with existing ground conditions.**

RESEARCH PROCESS: Forest Surveys FOR1060–1

TASK	OBSERVATION/RATING					
Preparation and Planning	4	3	2	1	0	N/A
Information Gathering and Processing	4	3	2	1	0	N/A
Content	4	3	2	1	0	N/A
Collaboration and Teamwork	4	3	2	1	0	N/A
Information Sharing	4	3	2	1	0	N/A

STANDARD IS 1 IN EACH APPLICABLE TASK

Rating Scale

The student:

4. exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence.
3. meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively.
2. meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately.
1. meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately.
0. has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

N/A Not Applicable

TASK CHECKLIST

The student:

Preparation and Planning
☐ sets goals and follows instructions accurately
☐ adheres to established timelines
☐ responds to directed questions and follows necessary steps to find answers
☐ uses time effectively

Information Gathering and Processing
☐ accesses basic in-school/community information sources
☐ uses one or more information-gathering techniques
☐ interprets and organizes information into a logical sequence
☐ records information accurately, using correct technical terms
☐ distinguishes between fact and fiction/opinion/theory
☐ responds to feedback when current approach is not working

Content
☐ suggests reasons for conducting a forest survey; e.g.:
  – types of information gathered
  – questions that are answered
☐ distinguishes between forest samples and forest populations, and provides examples of each

Content (continued)
☐ describes basic techniques used to sample a forested area; e.g.:
  – layout of sample plots
  – data collection techniques
☐ explains applications of the clinometer, increment borer and diameter tape in data collection
☐ explains how sample data may be used to estimate fibre volumes and other nonfibre forest resources
☐ provides a glossary of terms relevant to conducting a forest survey
☐ ______________________________
____
☐ ______________________________
____

Collaboration and Teamwork
☐ cooperates with group members
☐ shares work appropriately among group members

Information Sharing
☐ demonstrates effective use of one or more communication media:
e.g., written, oral, audio-visual
☐ communicates information in a logical sequence
☐ uses correct grammatical conventions and technical terms
☐ cites three or more basic information sources

REFLECTIONS/COMMENTS:

TASK CHECKLIST: Orienteering FOR1060–2

ALLOCATING TIME AND MATERIALS

The student:

☐ follows a schedule of activities for each orienteering task

☐ selects and uses appropriate equipment and materials

☐ uses appropriate safety devices; e.g.:
  - ☐ suitable clothing
  - ☐ protective eye wear
  - ☐ hard hat

☐ recognizes potential hazards and takes steps to eliminate/avoid them

☐ critically examines task performance, identifying strengths and areas that need improvement

BASIC COMPASS AND MEASUREMENT SKILLS

The student:

☐ orients a map using a compass:
  - ☐ places compass on map with edge along desired line of travel
  - ☐ rotates the capsule until the "N" on the compass dial points to true north on the map
  - ☐ checks to ensure that north-south lines are parallel with the map's meridians
  - ☐ reads the bearing at the top of the compass

BASIC COMPASS AND MEASUREMENT SKILLS (continued)

The student:

☐ establishes and follows a bearing using a compass:
  - ☐ sets the compass for the desired bearing of travel
  - ☐ holds the compass level and turns body until north end of the needle aligns with 0 degrees (compass north)
  - ☐ walks in direction of bearing, citing landmarks and checking course

☐ performs a closed traverse, error in closure no greater than 5% of perimeter distance:
  - ☐ starts at 0 degrees and walk 10 metres. Places stick in ground at this point
  - ☐ adds 90 degrees onto compass, setting it at 90 degrees. Aligns north end of needle with 90 degrees. Walks 10 metres in this direction using a measuring chain as guide. Places stick in ground at this point
  - ☐ adds 90 degrees onto compass, setting it at 180 degrees. Aligns north end of needle with 180 degrees. Walks 10 metres in this direction. Places stick in ground at this point
  - ☐ adds 90 degrees onto compass, setting it at 270 degrees. Aligns north end of needle with 270 degrees. Walks 10 metres in this direction. Returns to within one metre of starting point

☐

STANDARD IS 1 IN EACH APPLICABLE TASK

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence.

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively.

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately.

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately.

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

N/A Not Applicable

REFLECTIONS/COMMENTS

ALLOCATING TIME AND MATERIALS

The student:

- ☐ follows a schedule of activities for each orienteering task
- ☐ selects and safely uses appropriate equipment and materials
- ☐ uses appropriate safety devices; e.g.:
  - ☐ suitable clothing
  - ☐ protective eye wear
  - ☐ hard hat
- ☐ recognize potential hazards and takes steps to eliminate/avoid them.

BASIC FOREST MEASUREMENT

The student:

- ☐ measures horizontal distances up to 25 metres, accurate to within 5%
  - ☐ using pacing techniques
  - ☐ using a forester's chain
- ☐ measures the diameter of 10 trees at approximately 1.5 metres above-ground level, each accurate to within 5%, using a diameter tape
  - ☐ places sharp end of tape in tree at breast height
  - ☐ wraps tape around tree and determines tree circumference
  - ☐ accurately reads/calculates tree diameter at breast height (DBH)
- ☐

BASIC FOREST MEASUREMENT (continued)

- ☐ measures the height of 10 trees, accurate to within 5% on at least 8 trees, using a clinometer
  - ☐ measures 15 metres from the base of the tree
  - ☐ uses clinometer to determine elevation at this point in relation to base of the tree
  - ☐ aims clinometer at top of tree and reads height in metres
  - ☐ adjusts tree height to compensate for elevation in relation to base of the tree.
- ☐ measures the age of 10 trees, accurate to within 5% on at least 8 trees, using an increment borer
  - ☐ attaches boring bit to outer casing of increment borer
  - ☐ moves the boring bit into at least the centre of the tree at breast height by turning clockwise
  - ☐ inserts the core sampler into the boring bit and gives the borer one complete counter clockwise turn
  - ☐ slides the extracting tool gently between the core and borer and carefully withdraws both core and tool
  - ☐ determines tree age by counting rings on the core
  - ☐ places core sample back into the tree and seals boring hole
  - ☐ removes accumulations of resin and dirt from increment borer.
- ☐

TABULATING AND PRESENTING RESULTS

The student:

- ☐ makes accurate observations and inferences regarding tree measurements
- ☐ records data accurately and systematically (e.g., use a dot-dash tally)
- ☐ considers limitations and generalizability of the results of measurement
- ☐ reflects on procedures/outcomes/task performance and suggests refinements.

STANDARD IS 1 IN EACH APPLICABLE TASK

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence.

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively.

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately.

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately.

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

N/A Not Applicable

TASK CHECKLIST: Forest Survey FOR1060–4

ALLOCATING TIME AND MATERIALS

The student:

☐ follows a schedule of activities for conducting a forest survey

☐ selects and safely uses appropriate equipment and materials

☐ uses appropriate safety devices; e.g.:
  - ☐ suitable clothing
  - ☐ protective eye wear
  - ☐ hard hat

☐ recognizes potential hazards and takes steps to eliminate/avoid them.

CONDUCTING THE FOREST SURVEY

The student:

☐ establishes boundaries for a 100 square metre sample forest plot

☐ subdivides the plot into a number of subplots by extending string lines across the plot between two sides

☐ measures tree diameter by species, each accurate to within 5%, for all trees in the plot larger than 9.1 cm DBH

☐ records data regarding tree diameter, by species, using grid system and charts

☐ measures the height and age of 10 of the tallest trees in the plot, accurate to within 5% on at least 8 trees

CONDUCTING THE FOREST SURVEY (continued)

The student:

☐ records data regarding tree height and age, by species, using grid system and charts

☐ calculates fibre volume by species on a per hectare basis using sample plot data

☐

INTERPRETING SURVEY RESULTS

The student:

☐ demonstrates an understanding of problems encountered in conducting a forest survey

☐ records data accurately and systematically

☐ interprets sample data to make inferences regarding tree populations and fibre volume

☐ considers limitations of sampling techniques and survey results

☐ critically examines procedures/outcomes/task performance and suggests refinements

☐

STANDARD IS 1 IN EACH APPLICABLE TASK

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence.

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively.

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately.

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately.

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

N/A Not Applicable

REFLECTIONS/COMMENTS

RESEARCH PROCESS: Forest Ecosystems FOR1090–1

TASK	OBSERVATION/RATING					
Preparation and Planning	4	3	2	1	0	N/A
Information Gathering and Processing	4	3	2	1	0	N/A
Content	4	3	2	1	0	N/A
Collaboration and Teamwork	4	3	2	1	0	N/A
Information Sharing	4	3	2	1	0	N/A

STANDARD IS 1 IN EACH APPLICABLE TASK

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence.

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively.

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately.

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately.

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

N/A Not Applicable

TASK CHECKLIST

The student:

Preparation and Planning

☐ sets goals and follows instructions accurately
☐ adheres to established timelines
☐ responds to directed questions and follows necessary steps to find answers
☐ uses time effectively

Information Gathering and Processing

☐ accesses basic in-school/community information sources
☐ uses one or more information-gathering techniques
☐ interprets and organizes information into a logical sequence
☐ records information accurately, using correct technical terms
☐ distinguishes between fact and fiction/opinion/theory
☐ responds to feedback when current approach is not working

Content

☐ identifies living and non-living elements within a local forest ecosystem; e.g.:
  – soil characteristics
  – land form
  – climate
  – flora and fauna
  – soil organisms
☐ describes interrelationships among at least three living and three nonliving elements within a local forest environment; e.g.:
  – relationship of soil, air, water characteristics to plant growth
  – interactions and dependencies among living organisms

Content (continued)

☐ explains the role of trees within a local forest ecosystem; e.g.:
  – exchange of gases
  – water cycle
  – nutrient cycling (macro nutrients)
  – wildlife habitat
  – soil conservation
  – energy flow
☐ analyzes food relationships among living organisms within a local forest environment; e.g.:
  – role of producers, consumers and decomposers
  – food chains and webs
☐ describes the distribution of dominant species within a local forest environment on the basis of habitat requirements; e.g.:
  – common tree species
  – flowering plants of the understory
  – common mammals and birds

Collaboration and Teamwork

☐ cooperates with group members
☐ shares work appropriately among group members

Information Sharing

☐ demonstrates effective use of one or more communication media:
e.g., written, oral, audio-visual
☐ communicates information in a logical sequence
☐ uses correct grammatical conventions and technical terms
☐ cites three or more basic information sources

REFLECTIONS/COMMENTS:

KNOWLEDGE/APPLICATION ASSESSMENT: Structural Units of the Tree FOR1090–2

Assessment Criteria and Conditions:

- identifying and describing major tree parts (including roots, trunk, branches, leaves, flowers), their function and relationship to one another

Suggested Reference(s):

- *Alberta's Focus on Forests*

STANDARD: Respond to a standard of 1 on the rating scale

Rating Scale

The student:

4 meets project/task objectives in a self-directed manner. Provides explanations and critical judgements based on a superior knowledge base. Demonstrates an understanding of relevant concepts and related issues.

3 meets project/task objectives in a self-directed manner. Provides explanations and comparisons of relevant concepts using more precise terminology. Requires little or no prompting.

2 meets project/task objectives with limited assistance in planning and in selecting and using resources. Applies knowledge of concepts in different situations using correct terminology. Requires occasional prompting.

1 completes task as directed, demonstrating basic skills/completeness by following a guided course of action. Uses simple recall to demonstrate basic knowledge of concepts. Requires prompting.

0 does not complete the task, or is unable to provide a suitable response.

N/A Not Applicable

Background Information

See *Alberta's Focus on Forests*:

- Activity 2.1: Finding the Light
- Activity 2.2: Tree Waterworks I
- Activity 2.3: Tree Waterworks II
- Activity 2.4: Differences in Design
- Activity 2.5: Tree Keys
- Activity 2.6: New Trees from Old
- Activity 2.7: How Trees Grow

Sample Questions/Activities

1. **Explain vital life processes performed by trees and other forest plants;** e.g.:
   - nutrient uptake and transportation
   - photosynthesis
   - respiration and transpiration
   - reproduction
   - phenology (leaf flushings, leaf fall, flowering and cone production)
2. **Provide labelled diagrams of major tree parts;** e.g.:
   - root
   - trunk/stem
   - branch/twig
   - leaf
   - flower
3. **Describe the function of major tree parts in performing vital life processes.**
4. **Describe interrelationships among tree structures, their functions, and vital life processes that are performed.**
5. **Describe major stages in the life cycle of a native tree.**
6. **Describe the role of trees in the water cycle.**

LAB INVESTIGATIONS: Tree Biology **FOR1090–3**

TASK	OBSERVATION/RATING					
Management	4	3	2	1	0	N/A
Teamwork	4	3	2	1	0	N/A
Equipment and Materials	4	3	2	1	0	N/A
Investigative Techniques	4	3	2	1	0	N/A

STANDARD IS 1 IN EACH APPLICABLE TASK

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence.

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively.

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately.

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately.

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

N/A Not Applicable

TASK CHECKLIST

The student:

Management

- ☐ prepares self for task
- ☐ organizes and works in an orderly manner
- ☐ carries out instructions accurately
- ☐ uses time effectively

Teamwork

- ☐ cooperates with group members
- ☐ shares work appropriately among group members

Equipment and Materials

- ☐ selects and uses appropriate equipment/materials
- ☐ follows safe procedures/techniques
- ☐ weighs and measures accurately
- ☐ returns clean equipment/materials to storage areas

Investigative Techniques

- ☐ gathers and applies information from at least one source
- ☐ makes predictions that can be tested regarding at least three vital life processes performed by trees; e.g.:
  - nutrient uptake and transportation
  - photosynthesis
  - respiration
  - transpiration
  - reproduction
  - phenology
- ☐ sets up and conducts experiments to test predictions
- ☐ distinguishes between manipulated/responding variables
- ☐ obtains results that can be used to determine if some aspect of the prediction is accurate
- ☐ summarizes important experimental outcomes, relating structural units of the tree to their function in performing life processes

REFLECTIONS/COMMENTS:

KNOWLEDGE/APPLICATION ASSESSMENT: Forest Use FOR1100–1

Assessment Criteria and Conditions:

- identifying and explaining:
  - past and present uses of forests in Alberta and Canada
  - ways in which changes in forest use (and management) have affected the economy and the environment

Suggested Reference(s):

- *Alberta's Focus on Forests*
- *Our Growing Resource*

STANDARD: Respond to a standard of 1 on the rating scale.

Rating Scale

The student:

4 meets project/task objectives in a self-directed manner. Provides explanations and critical judgements based on a superior knowledge base. Demonstrates an understanding of relevant concepts and related issues.

3 meets project/task objectives in a self-directed manner. Provides explanations and comparisons of relevant concepts using more precise terminology. Requires little or no prompting.

2 meets project/task objectives with limited assistance in planning and in selecting and using resources. Applies knowledge of concepts in different situations using correct terminology. Requires occasional prompting.

1 completes task as directed, demonstrating basic skills/completeness by following a guided course of action. Uses simple recall to demonstrate basic knowledge of concepts. Requires prompting.

0 does not complete the task, or is unable to provide a suitable response

N/A Not Applicable

Background Information

See *Alberta's Focus on Forests*:

Unit 4 - Forest Resources and Technologies

- Activity 4.1: Trees of Alberta and Canada
- Activity 4.2: Products from Canada's Forests
- Activity 4.3: Surveying the Forest Resource
- Activity 4.4: From Pulp to Paper

Unit 5 - Forest Management for All

- Activity 5.1: Forest Values
- Activity 5.2: Decision for Change
- Activity 5.3: Forest Perspectives

Sample Questions/Activities

1. **Provide an overview of changing patterns of forest use in Canada and Alberta from past to present;** e.g.:
   - aboriginal use
   - fur trade
   - land clearing for agriculture
   - ship building
   - urbanization
   - sawmilling
   - pulp and paper
   - value-added products
   - recreational uses.
2. **Describe the history of forest land administration in Canada and Alberta;** e.g.:
   - Federal jurisdiction
   - Provincial status
   - *Natural Resources Transfer Act.*
3. **Suggest three or more ways in which changes in forest use (and management) have affected:**
   - the economy
   - the environment.
4. **Make predictions regarding the future use (and management) of forests in Alberta and Canada.**

KNOWLEDGE/APPLICATION ASSESSMENT: Sustainability FOR1100–2

Assessment Criteria and Conditions:

- definitions and examples of sustainable yield and sustainable development within the context of Alberta's forested regions

Suggested Reference(s):

- *Our Growing Resource*
- *Forestline*

STANDARD: Respond to a standard of 1 on the rating scale.

Rating Scale

The student:

4 meets project/task objectives in a self-directed manner. Provides explanations and critical judgements based on a superior knowledge base. Demonstrates an understanding of relevant concepts and related issues.

3 meets project/task objectives in a self-directed manner. Provides explanations and comparisons of relevant concepts using more precise terminology. Requires little or no prompting.

2 meets project/task objectives with limited assistance in planning and in selecting and using resources. Applies knowledge of concepts in different situations using correct terminology. Requires occasional prompting.

1 completes task as directed, demonstrating basic skills/completeness by following a guided course of action. Uses simple recall to demonstrate basic knowledge of concepts. Requires prompting.

0 does not complete the task, or is unable to provide a suitable response.

N/A Not Applicable

Background Information

See *Our Growing Resource*, Chapter 2 - The Challenge of Sustainable Development:

- Managing Forest Development
- Integrated Resource Management - Accommodating Many Uses
- Harvest Planning and Practices
- Reforestation
- Air and Water Quality
- Building Sustainable Businesses.

Sample Questions/Activities

1. **What does "sustainable yield" and "sustainable development" mean to you? Defend your response with information gathered through research (e.g., Alberta Environmental Protection).**

2. **Discuss the meaning of the following definition of sustainable forest management:**
   "the development of forests to meet current needs without prejudice to their future productivity, ecological diversity, or capacity for regeneration."

3. **Identify and explain major components/ considerations in sustainable forest management;** e.g.:
   - timber resources
   - biodiversity of wildlife
   - air, land and water quality.

4. **Interview representatives of three or more different forest industry organizations regarding their approach to sustainable forest management;** e.g.:
   - priorities
   - actions.

5. **Identify current research projects underway that are intended to support sustainable forestry practices.**

POSITION PAPER: Forest Management FOR1100–3

TASK	OBSERVATION/RATING					
Preparation and Planning	4	3	2	1	0	N/A
Content	4	3	2	1	0	N/A
Presenting/ Reporting	4	3	2	1	0	N/A

STANDARD IS 1 IN EACH APPLICABLE TASK

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence.

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively.

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately.

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately.

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

N/A Not Applicable

TASK CHECKLIST

The student:

Preparation and Planning

☐ sets goals and follows instruction accurately
☐ responds to directed questions and follows necessary steps to find answers
☐ accesses basic in-school/community information sources
☐ interprets and organizes information into a logical sequence
☐ records information accurately, using correct technical terms
☐ uses time effectively

Content

☐ provides a clear and concise statement of an issue regarding management of a forested region
☐ examines social, political, scientific, ethical, economic and/or environmental perspectives related to the issue
☐ explains why the issue is important by providing examples of possible consequences and their impact on sustainable yield and sustainable development
☐ states a position regarding the issue, and develops a logical argument and rationale for the position taken

Content (continued)

☐ develops a plan of action for dealing with the issue at local and/or global levels
☐ provides a glossary of terms relevant to the issue
☐ ________________________________
____
____

Presenting/Reporting

☐ demonstrates effective use of at least one medium of communication:
e.g., Written: *spelling, punctuation, grammar, basic format*
Oral: *voice projection, body language*
Audio-Visual: *techniques, tools*
☐ uses correct grammatical convention and technical terms through proofreading/editing
☐ provides an introduction that describes the purpose of the project
☐ communicates information in a logical sequence
☐ states a conclusion based on a summary of facts
☐ provides a reference list of three or more basic information sources

REFLECTIONS/COMMENTS:

RESEARCH PROCESS: Components of Forest Protection

FOR1100–4

TASK	OBSERVATION/RATING					
Preparation and Planning	4	3	2	1	0	N/A
Information Gathering and Processing	4	3	2	1	0	N/A
Content	4	3	2	1	0	N/A
Collaboration and Teamwork	4	3	2	1	0	N/A
Information Sharing	4	3	2	1	0	N/A

STANDARD IS 1 IN EACH APPLICABLE TASK

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence.

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively.

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately.

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately.

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

N/A Not Applicable

TASK CHECKLIST

The student:

Preparation and Planning

- ☐ sets goals and follows instructions accurately
- ☐ adheres to established timelines
- ☐ responds to directed questions and follows necessary steps to find answers
- ☐ uses time effectively

Information Gathering and Processing

- ☐ accesses basic in-school/community information sources
- ☐ uses one or more information-gathering techniques
- ☐ interprets and organizes information into a logical sequence
- ☐ records information accurately, using correct technical terms
- ☐ distinguishes between fact and fiction/opinion/theory
- ☐ responds to feedback when current approach is not working

Content

- ☐ cites reasons for protecting the forest resource; e.g.:
  - material and non-material benefits
  - environmental impact
- ☐ identifies and describes major components of forest protection; e.g.:
  - forest fire management
  - soil conservation and land reclamation
  - pest and disease control

Content (continued)

- ☐ explains basic goals and techniques of forest fire management, soil conservation and land reclamation
- ☐ identifies and describes symptoms of common forest pests and diseases
- ☐ compares different methods of pest and disease control; e.g.:
  - biological methods
  - forest management
  - chemical methods
- ☐ ______________________________

  ____

  ____

  ____

  ____

Collaboration and Teamwork

- ☐ cooperates with group members
- ☐ shares work appropriately among group members

Information Sharing

- ☐ demonstrates effective use of one or more communication media:

  e.g., written, oral, audio-visual
- ☐ communicates information in a logical sequence
- ☐ uses correct grammatical conventions and technical terms
- ☐ cites three or more basic information sources

REFLECTIONS/COMMENTS:

TASK CHECKLIST: Identifying Forest Pests **FOR1100–5**

COLLECTING/PHOTOGRAPHING PEST PROBLEMS

The student:

☐ collects, photographs and/or observes six or more instances of pest damage evident in a forest environment

☐ identifies and describes forest site and/or forest stand factors associated with each instance of pest damage

☐

USING THE IDENTIFICATION KEY TO IDENTIFY FOREST PESTS

The student:

☐ explains basic terminology used in the *Identification Key for Forest Pests* (FOR1100-6)

☐ explains steps in using a dichotomous key to identify pests or pest damage

☐ uses the identification key to correctly identify four or more forest pests and/or instances of pest damage

☐

RECOMMENDING PREVENTION/ CONTROL STRATEGIES

The student:

☐ uses information provided in the *Identification Key for Forest Pests* (FOR1100-6) to recommend appropriate prevention/control strategies for each of four pests identified

☐

STANDARD IS 1 IN EACH APPLICABLE TASK

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence.

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively.

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately.

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately.

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

N/A Not Applicable

REFLECTIONS/COMMENTS

Introduction

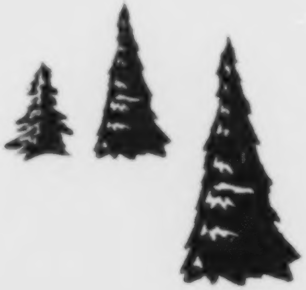
This identification guide includes only the most common insects and diseases that affect the forests of Alberta. It comprises the following identification keys:

Key 1: General
Key 2: Physical Injury
Key 3: Disease
Key 4: Animal/Insect Damage

Each key is not exhaustive in the pests and pest damages it can be used to identify. Together the keys serve only as a beginner's guide to the identification of some common forest pests in Alberta.

Each identification key is based on information provided from the following source:

Finck, Kelly E., P. Humphreys and G. Hawkins. 1989. *Field Guide to Pests of Managed Forests in British Columbia.* Forestry Canada and B.C. Ministry of Forests, Victoria, B.C. Joint Publ. No. 16. 188p.



Using the Keys

There are various factors/agents that cause damage in forest stands and in wood products. These can be grouped into the following categories:

- disease
- physical (abiotic) injury—primarily owing to climatic and soil factors
- animal damage
- insect damage.

When identifying the cause of damage in a forest stand we usually focus attention on the symptoms because they are visible. The first step is to use the General Key to determine which of the above agents of change are responsible.

Notice that each key provides two choices, e.g.:
a. whole tree affected
b. part of the tree affects.
Read both choices before selecting the appropriate one.

Glossary of Terms

Chlorotic:	yellowish foliage owing to lack of chlorophyll
Frass:	solid excrement and chewed debris from insects, especially larvae
Galleries:	wandering tunnels or cavities under bark or in wood, associated with bark beetles or wood borers
Pitch tube:	a lump of pitch accumulating on the outside of the bark of a conifer resulting from pitch flow caused by bark beetle attack
Resinosus:	an abnormal flow of pitch from a conifer usually in response to infection, insect activity or wounding

IDENTIFICATION KEY FOR FOREST PESTS (continued) FOR1100–6

KEY 1: GENERAL

- **a. Whole tree affected**
  - a. Crown entirely or partially discoloured, bright yellow, brown or red or lacking leaves or needles; trees may be broken, laying on the ground or standing and lower stem buried in sediment; crown, if present, may not be deformed
    - b. Widespread area affected, especially in low lying areas or in bands along slopes, near industrial sites, adjacent to streams or on lower slopes in mountainous terrain; trees in small clumps are uniformly affected
      Key 2: Physical Injuries
    - c. Trees affected randomly and to a varying extent
      - d. Sap present of stem or at root collar
        - e. Sap at root collar
          - f. Sap, mycelia, mushrooms or bracket fungi around root collar
            Key 3: Disease 1
          - f. Sap, tunnels, bark and wood fragments around root collar, roots chewed
            Key 4: Animal/Insect Damage
        - e. Sap, swelling, cankers or bracket fungi on main stem or branches
          Key 3: Disease 1
      - f. Bark removal from stems or roots
        Key 4: Animal/Insect Damage
  - b. Crown thin, yellow, poor growth, crown not generally deformed
    - g. Widespread area affected, impact on trees quite uniform, no evidence of disease. No evidence of industrial site nearby nor are trees on poor sites
      Key 2: Physical Injuries
    - g. Affected trees in patches or scattered individuals, standing dead and/or windthrown trees; trees affected to varying degrees
      Key 3: Disease 1

- **a. Part of tree affected**
  - h. Foliage, leaders and/or branch tips affected
    Key 1: General 2
  - h. Main stem and/or branches affected
    - a. Trees erect or windthrown in random manner, cankers, fungi, sap, brooms or swellings
      Key 3: Disease 1
    - i. No cankers, fungi, sap, brooms or swellings
      - j. Splintered or broken main stem, top and/or branches, windthrown trees lying in all the same direction
        Key 2: Physical Injuries
      - j. Pitch, frass or cottony tufts present, branch or main stem gouting and/or breakage which may or may not be present
        Key 4: Animal/Insect Damage

- **a. Foliage affected**
  - b. Trees affected in widespread area, especially in low lying areas or in bands along slopes
    Key 2: Physical Injuries 1
  - b. Trees affected in large to small areas, generally to varying extent
    - c. Needles uniformly coloured or mottled, small fruiting bodies or blisters present, main stems or branches may not be affected
      Key 3: Disease 1
    - c. Extensive loss of leaves or needles, or needles uniformly discoloured or mottled, generally from the top of crown downward and from the tips inward. Chewed or clipped needles, mined buds, exit holes, silk and/or insects present
      Key 4: Animal/Insect Damage

- **a. Leaders and/or branch tips affected**
  - d. Bark removed or tips clipped off
    Key 4: Animal/insect Damage
  - d. Bark not stripped, tips and/or buds not clipped
    - e. Tips may or may not curl, buds or needles mined, exit holes, frass, silk or cottony tufts present
      Key 4: Animal/Insect Damage
    - e. Tips discoloured
      - f. Small dark fruiting bodies or white to orange blisters or cankers on bark
        Key 3: Disease 1
      - f. Buds mushy, in low lying areas or industrial site nearby
        Key 2: Physical Injuries

BEST COPY AVAILABLE

KEY 2: PHYSICAL INJURIES

Physical Injuries 1: Injuries to Crown/Foliage or Tips

- **a. Tree leaning, windthrown or laying on ground**
  Key 2: Physical Injuries 2
- **a. Tree erect**
  - b. Damage to main stem and/or branches
    Key 2: Physical Injuries
  - b. Damage to crown
    Foliage discoloured or leaders and branch tips damaged
    - c. Tips of leaders, branches affected (including buds). Damage most intense in depressions. Buds, new shoots, and needles brown in spring. Shoots and needles brown in fall. Mushy buds, all species in a stand may be affected.
      Frost Damage
    - c. Foliage discolouration not restricted to the leaders, branches or branch tips. No evidence of insects, animals or disease. No industrial site nearby, generally no noticeable discolouration or death of deciduous and/or shrub layer. Crown in deep red-brown to brown
      - d. Damage in a band along a slope
        Red Belt Injury
      - d. Damage does not extend in a band along a slope; needles, if any, lacking flecking
        - e. Crown is brown from top down and from new to old needles; needles may drop especially in late summer
          Drought Damage
        - e. Crown devoid of foliage or entire crown reddish brown, scorched appearance, evidence of burned bark
          Fire Damage

Physical Injures 2: Injuries to Main Stem/Branches or Whole Tree

- **a. Tree leaning, windthrown or broken; young to mature trees**
  - b. Trees windthrown or broken
    - c. Trees blown over, crown intact, root "mats" present, trees lie in one direction, branches and stem of adjacent trees may be scarred or splintered
      Wind Damage
    - c. Evidence of numerous broken trees aligned at right angles to the slope on steep middle and lower slopes. Sharp line between old and young trees, damaged area may be occupied by shrubs and forbs
      Avalanche Damage
  - b. Young trees bent over or deformed, older trees with uneven and splintered breakage of tops and/or upper branches, cankers not evident
    Snow or Ice Damage
- **a. Tree erect, damage to main stem and/or branches**
  - d. Bark removal of main stem generally evident
    - e. Main stem severely debarked and deeply gouged, exposed wood splintered, evidence of logging or construction activities adjacent, may also be associated with adjacent windfall
      Mechanical Damage
    - e. Main stem may be debarked but no evidence of gouging, splintering on wood; evidence of burned branch ends and charcoal
      Fire Damage
  - d. Main stem not severely damaged
    - f. Branches and/or tops broken or splintered, cankers not evident
      Snow or Ice Damage
    - f. Branches and/or top not broken or splintered
      - g. Upper surface of branches have wounds or scars associated with green ragged crown, scars may or may not be on main stem
        Hail Damage
      - g. Scars on main stem, bark removed from scar or lower stem buried
        - h. Extended scars at ground level
          Fire Scar
        - h. Lower section of stem buried by sediment from adjacent stream
          Flood Damage

KEY 3: DISEASE

Disease 1: Diseases of roots and those affecting more than one kind of tissue

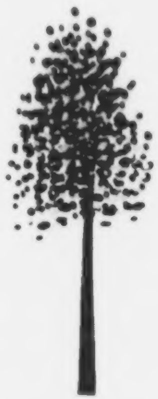
a. **Whole tree affected**
No cankers; scattered pockets of trees with think chlorotic crown with poor growth or standing dead, wind toppled trees in crisscross pattern, trees of all ages affected
Root Rots

a. **Part of tree affected**
  - b. Part of crown affected
    Crown red, dead top and/or branches, cankers on main stem and/or branches – on pines only
    Key 3: Disease 2
  - b. Either foliage or stem and/or branches affected
    - c. Young to mature stand with conks, flattened areas, swellings or brooms
      Key 3: Disease 2
      - d. No brooms or aerial shoots
        Key 3: Disease 2
      - d. Brooms present, minor needle discolouration, no blisters on needles, aerial shoots or basal cups on swollen areas of branches and brooms. Branch pattern whorled
        Lodgepole Pine Dwarf Mistletoe

Disease 2: Cankers, Rusts and Trunk Rots

a. **Various types of conks visible on tree trunks or bracket fungi on ground near base of tree**
Trunk Rot

a. **Absence of conks or bracket fungi on stem or near base of tree**
  - b. No noticeable swelling on stem, dead areas consist of flattened or depressed tissue, dead bark may have peeled off stem
    - c. On Aspen, rough, flattened area, black cracked bark
      Hypoxylon Canker
    - c. On Lodgepole Pine, elongated sunken, perennial canker, usually on the lower bole. Sap, branch flagging, blue-black stain in sapwood under the canker
      Atropellis Canker
  - b. Spindle to oval-shaped swellings present on pines, raised areas on main stem and/or branches. Noticeable blistering of bark, sometimes extended scars. Fruiting structures are white, yellow or orange powdery blisters
    Pine Stem Rusts



KEY 4: ANIMAL/INSECT DAMAGE

Animal Damage

a. Bark removed from roots, branches or stem
b. Bark removed from buried roots
Vole

b. Bark removed from branches and/or main stem
c. Damage below 2.5 m
d. Bark stripped from main stem and branches
e. Bark pulled away in large strips, tooth and claw marks on sapwood
Bear
e. Shredded bark remaining on tree, long vertical tooth marks
Deer
d. Bark and sapwood gnawed
f. Shallow gnaw marks
g. Exposed sapwood has rough appearance
Snowshoe Hare or Cottontail Rabbit
g. Exposed sapwood fairly smooth
Tree Squirrel
f. Deep gnaw marks, distinct tooth marks
Porcupine
c. Damage above 2.5 m
h. Shallow gnaw marks
Tree Squirrel
h. Deep gnaw marks
Porcupine

a. Stems and/or branches cut or damage to foliage
i. Stems and/or branches cut, multiple chips to 4 cm long at base of tree or branch
Beaver

Insect Damage

a. Entire crown affected
b. Coniferous hosts. Needles chewed to varying degrees, needle stubs may or may not remain on the tree
Defoliators (Sawflies or Budworms)
b. Deciduous hosts
Defoliators (Tent Caterpillars, Leaf-Eating Beetles, Leaf Miners)

a. Leaders and branches, stems, roots or cones affected
c. Leaders and branches affected
Terminal Weevils
c. Main stems affected
d. Entire tree dying. Crown yellow or reddish brown: boring dust around base of tree, tunnels on inside of bark
Bark Beetles
d. Tree may be alive or dead; may have presence of sap flow from insect entrance holes; insect feeding penetrates deeply into wood
Wood Borers or Carpenter Ants
c. Roots or root collar area affected. Pitch tubes at root collar. Sap soaked duff near root collar. Trees up to 3 m tall are most susceptible, entire crown may be reddish
Warren's Root Collar Weevil
c. Cones and/or seed affected
g. Pitch and silk webbing present on the exterior of the cone
Coneworms
h. Absence of pitch and silk. Exit holes on exterior of cone may be visible
Chalcid Wasp

GUIDE TO INFERENCES: Personal Impact on Forests FOR2010–1

INFERENCE

Definition: to derive a conclusion from facts or premises

Synonyms: infer, deduce, deduct, draw, gather , judge

Criteria for Assessing Inferences

Inferences made in intermediate level modules should communicate the process used to derive conclusions. Inferences are valid if they are communicated in a logical sequence with sufficient supporting detail. Both the type and amount of information used to derive a conclusion are important in determining the validity of the inference.

Each inference made regarding the impact of daily living activities on forest ecosystems should provide:

- ☐ a clear statement of the situation
- ☐ relevant facts and detail that support more than one point of view e.g., cultural, ethical, economic, environmental, health-related
- ☐ a logical sequence of ideas that lead to a conclusion
- ☐ evidence that different points of view were considered in deriving the conclusion
- ☐ a conclusion that is valid and realistic in light of the information gathered.

Log of Reflections and Inferences

The log will include five or more journal entries that describe daily living activities having impact on forest ecosystems. Activities may be seasonal in nature (e.g., burning wood for heat), yet need to be of sufficient duration to permit reflection on their consequences. Each journal entry should describe:

- ☐ the nature of the activity
- ☐ a rationale for participating in the activity
- ☐ inferences regarding both short- and long-term consequences for forest ecosystems.

Journal entries may reference activities that:

- involve the consumption of fibre-based products; e.g.:
  - wood as a fuel
  - paper and paper products
  - food products/additives
- involve recreational use of the forest; e.g.:
  - personal use of forest environments
  - use of recreational vehicles
  - participation in hunting and/or fishing activities
- influence the forest in indirect ways; e.g.:
  - use of heat in the home
  - turning on an electric light
  - use of an automobile.

RATING SCALE

4	3	2	1	0
Exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence.	Meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively.	Meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately.	Meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately.	Has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

RESEARCH PROCESS: Recycling Techniques FOR2010–2

TASK	OBSERVATION/RATING					
Preparation and Planning	4	3	2	1	0	N/A
Information Gathering and Processing	4	3	2	1	0	N/A
Content	4	3	2	1	0	N/A
Collaboration and Teamwork	4	3	2	1	0	N/A
Information Sharing	4	3	2	1	0	N/A

STANDARD IS 2 IN EACH APPLICABLE TASK

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence.

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively.

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately.

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately.

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

N/A Not Applicable

TASK CHECKLIST

The student:

Preparation and Planning

☐ sets goals and establishes steps to achieve them
☐ creates and adheres to useful timelines
☐ uses personal initiative to formulate questions and find answers
☐ plans and uses time effectively

Information Gathering and Processing

☐ accesses a range of relevant in-school/community resources
☐ uses a range of information-gathering techniques
☐ interprets, organizes and combines information into a logical sequence
☐ records information accurately with appropriate supporting detail and using correct technical terms
☐ determines accuracy/currency/reliability of information sources
☐ gathers and responds to feedback regarding approach to the task

Content

☐ identifies different types of refuse that can be recycled in practical and economical ways
☐ identifies four or more products recently developed through recycling techniques; e.g.:
  - plastic wood
  - paper
  - synthetic fibres
  - clothing

Content (continued)

☐ identifies advantages and disadvantages associated with each of four recycled products, and trade-offs that occur through the recycling process; e.g.:
  - social
  - economic
  - environmental

☐ ________________________________
____

☐ explains in detail technologies and processes used to develop one or more recycled products, and prepares flowcharts/diagrams that illustrate major stages/steps in the recycling process

☐ ________________________________
____

Collaboration and Teamwork

☐ cooperates with group members
☐ shares work appropriately among group members
☐ negotiates solutions to problems

Information Sharing

☐ demonstrates effective use of two or more communication media:
e.g., written, oral, audio-visual
☐ communicates ideas in a logical sequence with sufficient supporting detail
☐ maintains acceptable grammatical and technical standards
☐ cites five or more relevant information sources

REFLECTIONS/COMMENTS:

ISSUE ANALYSIS: Reducing, Reusing and Recycling FOR2010–3

TASK	OBSERVATION/RATING					
Preparation and Planning	4	3	2	1	0	N/A
Analyzing Perspectives	4	3	2	1	0	N/A
Collaboration and Teamwork	4	3	2	1	0	N/A
Evaluating Choices/Making Decisions	4	3	2	1	0	N/A

STANDARD IS 2 IN EACH APPLICABLE TASK

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence.

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively.

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately.

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately.

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

N/A Not Applicable

TASK CHECKLIST

The student:

Preparation and Planning

☐ accurately describes an issue related to reducing, reusing and/or recycling on which people disagree, explaining areas of disagreement
☐ poses one or more thoughtful questions regarding the issue
☐ accesses a range of relevant in-school/community resources
☐ uses a range of information-gathering techniques

Analyzing Perspectives

☐ identifies and categorizes trade-offs that occur through reducing, reusing and/or recycling e.g., *cultural, ethical, economic, environmental, health-related*
☐ states a position on the issue and reasons for adopting that position
☐ states two or more opposing positions on the issue and reasons for adopting each position
☐ describes interrelationships among different perspectives/points of view
☐ determines accuracy/currency/reliability of information and ideas

Collaboration and Teamwork

☐ shares work appropriately among group members
☐ respects and considers the views of others
☐ negotiates solutions to problems

Evaluating Choices/Making Decisions

☐ identifies important and appropriate alternatives regarding reducing, reusing and/or recycling
☐ establishes knowledge- and value-based criteria for assessing each alternative: e.g., *social, economic, environmental*
☐ ______________________________
____
____
☐ selects an appropriate alternative by showing differences among choices
☐ assesses strengths/weaknesses of decisions made regarding the issue by considering consequences
☐ ______________________________
____
____
☐ communicates ideas in a logical sequence with sufficient supporting detail to justify choices/decisions made

REFLECTIONS/COMMENTS:

PRESENTATIONS/REPORTS: Managing Alberta's Forested Lands FOR2030–1

TASK	OBSERVATION/RATING					
Preparation and Planning	4	3	2	1	0	N/A
Content	4	3	2	1	0	N/A
Presenting/ Reporting	4	3	2	1	0	N/A

STANDARD IS 2 IN EACH APPLICABLE TASK

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence.

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively.

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately.

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately.

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

N/A Not Applicable

TASK CHECKLIST

The student:

Preparation and Planning

☐ sets goals and describes steps to achieve them
☐ uses personal initiative to formulate questions and find answers
☐ accesses a range of relevant in-school/ community resources
☐ interprets, organizes and combines information into a logical sequence
☐ records information accurately with appropriate supporting detail and using correct technical terms
☐ plans and uses time effectively
☐ gathers and responds to feedback regarding approach to task and project status

Content

☐ provides a timeline of major changes that have occurred in the ownership and administration of forested lands in Alberta; e.g.:
  – Federal jurisdiction
  – Provincial status
  – *Natural Resources Transfer Act*
☐ describes different land tenures in Alberta today; e.g.:
  – public (provincial and federal crown lands)
  – private
☐ prepares a map that outlines different land management areas in Alberta; e.g.:
  – white area
  – green area

Content (continued)

☐ explains the mandates of five or more agencies responsible for managing forested lands within Alberta's boundaries; e.g.:
  – Alberta Environmental Protection
  – Parks Canada
  – private ownership
  – Metis or Native Indian
  – Forestry Canada
☐ prepares a graph (e.g., circle) that depicts current land ownership distribution in Alberta
☐ ______________________________
____
____

Presenting/Reporting

☐ demonstrates effective use of at least two communication media:
  e.g., Written: *spelling, punctuation, grammar, format (formal/ informal)*
  Oral: *voice projection, body language, appearance*
  Audio-Visual: *techniques, tools, clarity*
☐ maintains acceptable grammatical and technical standards through proofreading and editing
☐ provides an introduction that describes the purpose and scope of the project
☐ communicates ideas into a logical sequence with sufficient supporting detail
☐ states a conclusion by synthesizing the information gathered
☐ provides a reference list that includes five or more relevant information sources

REFLECTIONS/COMMENTS:

SAMPLE TIMELINE: Management History of Alberta's Forested Lands FOR2030–2

DATE	EVENT
1670-1870	Forests are administered by the Hudson Bay Co.
1870	Government of Canada administers forest lands
1885	Disposition of timber is administered by public competition.
	Criteria similar to present-LTPs
1905	Alberta becomes a province September 1, 1905, but does not have control of resources
1910	*Forest Reserves and Parks Act* replaces *Forest Reserves Act* of 1906
	Five forests are created
1930	Control of natural resources is transferred to Alberta
1948	Crowsnest, Bow and Clearwater forests are placed under AEUB (formerly ERCB) jurisdiction
	Green and Yellow areas are established in Alberta
1949	The Department of Lands and Forests is created
	The first *Forests Act* is passed
1966	The timber quota system is established.
19--	---------
19--	---------
19--	---------

Reference: *Public Hearings on the Environmental Effects of Forestry Operations in Alberta, Perspectives II - The Forest Industry in Alberta*

FORESTS ACT

This Act provides overall direction for forest legislation (primarily the allocation of timer harvesting rights) in Alberta. It consists of four parts:

1. Administration - defines forest officers, specifies who can make regulations, prescribes uses and prohibited activities.
2. Crown Timber - specifies the four methods of allocating cutting rights to crown timber. Conditions associated with each tenure are outlined.
3. Forest Land Uses - outlines the means to authorize, prescribe and control recreational activities on forested land.
4. Offences and Penalties - outlines offences under the *Forests Act* and prescribes penalties.

Timber Management Regulation

This regulation is more specific than the *Forests Act*. It specifies the conditions associated with Timber Quotas, Commercial Timber Permits (CTPs), Local Timber Permits (LTPs), Forest Products tags, Christmas tree permits, rates of crown dues, timber appraisal, payments of crown charges, clearing land for industrial uses and general provisions. The amounts of specific penalties are also indicated.

Typical content provided in a Forest Management Agreement (FMA) would be:

- description of area
- land withdrawals
- rights over the land
- forest management provisions
  - general
  - reforestation
  - forest protection
- records and scaling
- charges and dues
- mill construction and operation
- deposit
- general provisions.

Forest Land Use and Management Regulations

These regulations control vehicle access into Willmore Wilderness Park and prescribe penalties for the contravention of regulations.

Forest Recreation Regulation

This regulation establishes Forest Land Use Zones, Forest Recreation Areas and Forest Recreation trails. Activities permitted in a Forest Recreation Area are indicted, along with prescribed user fees.

THE FOREST AND PRAIRIE PROTECTION ACT

This Act authorizes legislation that covers all aspects of protecting the forest from fire.

The Forest and Prairie Protection Regulations

Part I

- issuing of fire permits
- fire prevention precautions (industrial, pipe line, campfires, incinerators, power saws)
- travel in a closed area
- conscription exemptions
- required fire fighting equipment
- liability

Part II

- fire hazard reduction procedures for debris disposal associated with:
  - logging
  - agriculture
  - geophysical exploration
- conduct of firefighting operations
- pollution and erosion control.

FOREST RESERVES ACT

This Act provides a means of establishing forest reserves in Alberta. These reserves are generally south of the 12th Base line and include most of the Foothills South Region. Procedures are indicated for:

- acquiring land
- making regulations
- cancelling permits
- posting signs
- identifying offences and issuing penalties.

Forest Reserves Regulations

These regulations specify the conditions associated with domestic grazing within Forest Reserves, and include:

- types of permits
- requirements of a range management plan
- conditions associated with grazing.

PROVINCIAL PARKS ACT

This Act gives authority to the Government of Alberta to establish criteria for creating provincial parks. It deals with:

- purpose of parks and recreation areas
- authority to acquire land for parks
- authority to create parks and recreation areas
- authority to make regulations for disposition of land for parks
- authority of the Minister regarding closures, concessions, standards of operations and zoning
- control and protection of roads
- authority of parks officers
- seizures
- offences.

WILLMORE WILDERNESS PARK ACT

This Act establishes the Willmore Wilderness area. It identifies intended uses (mines and minerals are not subject to this Act) and gives Cabinet the authority to make regulations.

WILDERNESS AREAS ACT

This Act identifies procedures for establishing a wilderness area. It deals with:

- land acquisition
- programs permitted in a wilderness area
- prohibited activities
- travel restrictions
- provision of adjacent buffer areas
- offences and penalties.

RESEARCH PROCESS: Allocation Procedures for Land and Timber FOR2030–4

TASK	OBSERVATION/RATING					
Preparation and Planning	4	3	2	1	0	N/A
Information Gathering and Processing	4	3	2	1	0	N/A
Content	4	3	2	1	0	N/A
Collaboration and Teamwork	4	3	2	1	0	N/A
Information Sharing	4	3	2	1	0	N/A

STANDARD IS 2 IN EACH APPLICABLE TASK

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence.

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively.

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately.

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately.

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

N/A Not Applicable

TASK CHECKLIST

The student:

Preparation and Planning

- ☐ sets goals and establishes steps to achieve them
- ☐ creates and adheres to useful timelines
- ☐ uses personal initiative to formulate questions and find answers
- ☐ plans and uses time effectively

Information Gathering and Processing

- ☐ accesses a range of relevant in-school/community resources
- ☐ uses a range of information-gathering techniques
- ☐ interprets, organizes and combines information into a logical sequence
- ☐ records information accurately with appropriate supporting detail and using correct technical terms
- ☐ determines accuracy/currency/reliability of information sources
- ☐ gathers and responds to feedback regarding approach to the task

Content

- ☐ explains the use of dispositions/authorizations in the form of permits, licences and other legal agreements in managing commercial activities on forested lands
- ☐ identifies different public land users/uses, and criteria for establishing forest land and timber dispositions; e.g.:
  - fibre production
  - recreation/agriculture
  - wildlife habitat

Content (continued)

- ☐ describes the intent of three or more different timber dispositions issued by the Alberta Forest Service, and the responsibilities of holders of these dispositions
- ☐ describes the intent of three or more other types of dispositions used to manage nonfibre aspects of forest use; e.g.:
  - grazing
  - hunting, fishing and trapping
  - energy and mineral development
- ☐ explains the role of consultation (with other resource users) and public involvement in establishing land and timber dispositions
- ☐ ______________________________
  ____
- ☐ ______________________________
  ____

Collaboration and Teamwork

- ☐ cooperates with group members
- ☐ shares work appropriately among group members
- ☐ negotiates solutions to problems

Information Sharing

- ☐ demonstrates effective use of two or more communication media:
  e.g., written, oral, audio-visual
- ☐ communicates ideas in a logical sequence with sufficient supporting detail
- ☐ maintains acceptable grammatical and technical standards
- ☐ cites five or more relevant information sources

REFLECTIONS/COMMENTS:

TASK CHECKLIST: Woods Survival 2 **FOR2040–1**

TRIP PLANNING AND PREPARATION

The student:

- ☐ establishes specific objectives for an outdoor wilderness trip; e.g.:
  - ☐ goals and expectations
  - ☐ length of trip
  - ☐ destination
  - ☐ general itinerary and daily agendas
- ☐ prepares a camping menu for self that addresses:
  - ☐ expected caloric output
  - ☐ all food groups included in the *Canada's Food Guide for Healthy Eating*
  - ☐ concerns related to food spoilage
  - ☐ provisions for emergency
- ☐ plans for weather and seasonal conditions; e.g.:
  - ☐ identify hazards particular to the area
  - ☐ listen to weather and news reports/forecasts
- ☐ incorporates guidelines for environmental awareness into trip planning; e.g.:
  - ☐ principles of ecotourism
  - ☐ consideration for carrying capacity
  - ☐ strategies for minimum impact land use
- ☐ identifies and obtains appropriate supplies, equipment and personal gear for the trip; e.g.:
  - ☐ water and food
  - ☐ tent, stove, axe
  - ☐ first-aid and survival supplies
  - ☐ clothing and foot wear
  - ☐ toiletries

TRIP PLANNING AND PREPARATION (continued)

The student:

- ☐ conducts pre-trip assessment of supplies, equipment and personal gear; e.g.:
  - ☐ compares to trip checklist
  - ☐ assesses quality, quantity and condition
  - ☐ assesses relative to weather and seasonal conditions
  - ☐ obtains missing and/or specialty items
- ☐ prepares supplies, equipment and personal gear for transportation; e.g.:
  - ☐ addresses weight restrictions
  - ☐ makes efficient use of space
  - ☐ packs food to prevent spoilage and minimize odour
- ☐ plans course of action to cope with potential emergency situations in the wilderness; e.g.:
  - ☐ extreme weather conditions
  - ☐ fire or flood
  - ☐ injury and illness
  - ☐ avalanche
- ☐
- ☐

CONDUCTING THE TRIP

The student:

- ☐ follows guidelines for safe travel in the forest; e.g.:
  - ☐ follows travel schedule as planned
  - ☐ uses orientation and navigational skills
  - ☐ identifies potential hazards and take necessary precautions
  - ☐ dresses according to mode of travel, weather and season
  - ☐ watches for changes in current weather conditions
- ☐ sets up campsite following guidelines for comfort, safety and least possible environmental impact; e.g.:
  - ☐ selects appropriate campsite
  - ☐ erects tent or lean-to
  - ☐ assembles other amenities
  - ☐ protects food from wildlife and spoilage
  - ☐ protects equipment from the elements
- ☐ follows minimal impact guidelines in establishing and using campsite; e.g.:
  - ☐ latrine location and toilet procedures
  - ☐ wash area and procedures
  - ☐ fire site and use
  - ☐ garbage and waste water disposal
- ☐ complies with local, provincial and federal legislation relevant to activities that are undertaken
- ☐ assumes camp duties on a rotational basis; e.g.:
  - ☐ meal preparation
  - ☐ camp maintenance and hygiene

CONDUCTING THE TRIP (continued)

The student:

☐	monitors the activities of wildlife in the area and takes precautions to avoid dangerous situations
☐	
☐	

WILDERNESS INTERACTION

The student:

☐	performs a closed traverse (accurate to within 5%) with a minimum of six legs and total perimeter distance between 1 and 3 kilometres
☐	identifies 25 tree, shrub and/or other plant species
☐	identifies, **while demonstrating appropriate safety/health precautions**, five different: ☐ animal tracks and scat ☐ hazardous plants ☐ forest insects
☐	identifies five or more uses of forest plants for human survival and comfort in the wilderness environment
☐	spends three hours alone in a designated forest area, and shares experiences and coping strategies

WILDERNESS INTERACTION (continued)

The student:

☐	
☐	

BREAKING CAMP AND CONCLUDING THE TRIP

The student:

☐	follows appropriate procedures for breaking camp: ☐ packs supplies, equipment and personal gear ☐ takes down shelter ☐ cleans site ☐ does circle tour of site
☐	conducts a post-trip assessment: ☐ observations and personal impressions ☐ activities well done ☐ problems encountered ☐ recommendations regarding future trips
☐	
☐	

STANDARD IS 2 IN EACH APPLICABLE TASK

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence.

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively.

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately.

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately.

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

N/A Not Applicable

REFLECTIONS/COMMENTS

POST-TRIP ASSESSMENT FOR WOODS SURVIVAL 2

FOR2040–2

TASK	OBSERVATION/RATING					
Individual/Group Preparedness	4	3	2	1	0	N/A
Cooperation and Teamwork	4	3	2	1	0	N/A
Responsibility and Safety	4	3	2	1	0	N/A
Environmental Ethics	4	3	2	1	0	N/A

STANDARD IS 2 IN EACH APPLICABLE TASK

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence.

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively.

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately.

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately.

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

N/A Not Applicable

TASK CHECKLIST

The student:

Individual/Group Preparedness
- ☐ sets goals and follows instructions accurately
- ☐ adheres to established timelines
- ☐ identifies/assembles outdoor gear appropriate to the task
- ☐ uses time effectively
- ☐ identifies tasks well done
- ☐ identifies problems encountered and suggests solutions
- ☐ makes recommendations regarding future trips
- ☐ ____________________
- ☐ ____________________

Cooperation and Teamwork
- ☐ works with a range of peer members
- ☐ shares work appropriately among group members
- ☐ considers the ideas/suggestions of others
- ☐ identifies tasks well done
- ☐ identifies problems encountered and suggests solutions
- ☐ makes recommendations regarding future trips
- ☐ ____________________
- ☐ ____________________

Responsibility and Safety
- ☐ selects and uses appropriate equipment/materials
- ☐ follows safe procedures/techniques
- ☐ anticipates and advises of potential hazards
- ☐ practises proper sanitation procedures
- ☐ identifies tasks well done
- ☐ identifies problems encountered and suggests solutions
- ☐ makes recommendations regarding future trips
- ☐ ____________________
- ☐ ____________________

Environmental Ethics
- ☐ uses environmentally friendly materials
- ☐ picks up garbage and carries out everything that is carried in
- ☐ avoids ecologically sensitive areas
- ☐ demonstrates techniques for protecting water supply
- ☐ identifies tasks well done
- ☐ identifies problems encountered and suggests solutions
- ☐ makes recommendations regarding future trips
- ☐ ____________________
- ☐ ____________________

REFLECTIONS/COMMENTS:

RESEARCH PROCESS: Random and Systematic Sampling Techniques FOR2060–1

TASK	OBSERVATION/RATING					
Preparation and Planning	4	3	2	1	0	N/A
Information Gathering and Processing	4	3	2	1	0	N/A
Content	4	3	2	1	0	N/A
Collaboration and Teamwork	4	3	2	1	0	N/A
Information Sharing	4	3	2	1	0	N/A

STANDARD IS 2 IN EACH APPLICABLE TASK

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence.

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively.

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately.

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately.

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

N/A Not Applicable

TASK CHECKLIST

The student:

Preparation and Planning

☐ sets goals and establishes steps to achieve them

☐ creates and adheres to useful timelines

☐ uses personal initiative to formulate questions and find answers

☐ plans and uses time effectively

Information Gathering and Processing

☐ accesses a range of relevant in-school/community resources

☐ uses a range of information-gathering techniques

☐ interprets, organizes and combines information into a logical sequence

☐ records information accurately with appropriate supporting detail and using correct technical terms

☐ determines accuracy/currency/reliability of information sources

☐ gathers and responds to feedback regarding approach to the task

Content

☐ distinguishes between random and systematic sampling techniques

☐ defines/illustrates and explains the steps involved in conducting:
  - random plot samples
  - random transect samples
  - systematic plot samples
  - systematic transect samples

Content (continued)

☐ identifies sampling designs suited to gathering specific data regarding:
  - distribution of a tree species
  - growth, age and/or volume of trees
  - soil, water and/or wildlife characteristics
  - potential for recreation and/or agriculture

☐ explains sources of bias and error in random and systematic sampling designs, and problems related to use of the sample data in estimating forest values or populations

☐ ______________________________

☐ ______________________________

Collaboration and Teamwork

☐ cooperates with group members

☐ shares work appropriately among group members

☐ negotiates solutions to problems

Information Sharing

☐ demonstrates effective use of two or more communication media:
e.g., written, oral, audio-visual

☐ communicates ideas in a logical sequence with sufficient supporting detail

☐ maintains acceptable grammatical and technical standards

☐ cites five or more relevant information sources

REFLECTIONS/COMMENTS:

TASK CHECKLIST: Sampling Fibre and Non-Fibre Forest Values FOR2060–2

ALLOCATING TIME AND MATERIALS

The student:

☐ develops and follows a schedule of activities for sampling forest values

☐ selects and safely uses appropriate equipment and materials

☐ uses appropriate safety devices; e.g.:
  - ☐ protective clothing
  - ☐ protective eye wear
  - ☐ hard hats

☐ recognizes potential hazards and takes steps to eliminate/avoid them.

SAMPLING DESIGN

The student:

☐ identifies goals/outcomes for a forest survey

☐ determines the type and amount of data to be collected

☐ selects a sampling technique suited to survey goals/outcomes and type/amount of data to be collected; e.g.:
  - ☐ random
  - ☐ systematic
  - ☐ transect
  - ☐ plot

☐ establishes boundaries for the sample area

☐ designs a data collection sheet appropriate to the information to be collected

☐ takes necessary precautions to address health and safety concerns throughout the planning process (e.g., huanta virus in owl pellets)

COLLECTING, RECORDING AND COMPILING SAMPLE DATA

The student:

☐ collects sample data regarding a specific fibre and nonfibre value on 0.01% of the forested area

☐ records data accurately and systematically, using standard data collection techniques

☐ adheres to health and safety practices while collecting and recording data

☐ performs calculations on sample data as required in order to estimate fibre and nonfibre resources

☐ prepares a summary of fibre data accurate to within 10% of existing volume estimates

☐ states conclusions regarding fibre and nonfibre values based on observations and compilations of sample data.

☐

☐

SUMMARIZING AND ASSESSING SURVEY RESULTS

The student:

☐ summarizes the strengths and weaknesses of the sample data

☐ considers limitations and generalizability of conclusions drawn regarding fibre and nonfibre values in the forested area

☐ critically examines procedures/outcomes/ task performance and suggests refinements.

SUMMARIZING AND ASSESSING SURVEY RESULTS (continued)

The student:

☐

☐

STANDARD IS 2 IN EACH APPLICABLE TASK

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence.

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively.

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately.

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately.

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

N/A Not Applicable

REFLECTIONS/COMMENTS

BEST COPY AVAILABLE

SAMPLE DATA SHEET: Fibre and Non-Fibre Forest Values FOR2060–3

ACTIVITY #1

TREE HEIGHT/DIAMETER

Measure and record the total height and diameter at breast height for all trees in the plot marked out by flagging tape.

Species	Diameter	Height

ACTIVITY #2

TREE HEIGHT

Determine the height of four flagged trees.

Tree #	Height (Metres)
1	
2	
3	
4	

ACTIVITY #3

TREE AGE

Use an increment borer to find the age, at breast height, of four marked trees.

Tree #	Age	# of Rings in Last 2.5 cm	Last Years Growth Included (Yes or No)
1			
2			
3			
4			

ACTIVITY #4

SAMPLE VOLUME CALCULATION

Use volume tables to determine the volume/ha for each species. Then calculate the total volume/ha. Data is collected from a 10 m x 10 m plot.

SPRUCE		ASPEN	
Diameter (cm)	Height (cm)	Diameter (cm)	Height (cm)
12	12	12	14
32	18	22	18
26	17	22	18
18	13	30	21
22	16	18	18
40	24		
52	24		
62	28		
16	14		
14	13		
16	13		
20	16		

Volume (Spruce) = ____________________

Volume (Aspen) = ____________________

TOTAL VOLUME/HA = ______________

ACTIVITY #5

SAMPLE WILDLIFE INVENTORY FORM

Signs of Browsing # ______________ Evidence (# species) ____________

Signs of scat # ___________________ Distance of nearest water _______m

Distance to nearest permanent housing _____________________________km

Availability of forage: low medium high

Type: ______________________________________

Availability of browse species: low medium high

Type: ______________________________________

Other signs of wildlife (e.g., nests, burrows): ______________________

____

____

ACTIVITY #6

SAMPLE INSECT AND DISEASE INVENTORY FORM

Evidence of insects: low medium high

Evidence of disease: low medium high

Specimen 1:			
Attack location	roots	yes	no
	trunk	yes	no
	foliage	yes	no
Specimen 2:			
Attack location	roots	yes	no
	trunk	yes	no
	foliage	yes	no
Specimen 3:			
Attack location	roots	yes	no
	trunk	yes	no
	foliage	yes	no

KNOWLEDGE/APPLICATION ASSESSMENT: Forest Harvest FOR2070–1

Assessment Criteria and Conditions:

- identifying major components of a plan for forest harvest, including:
  - when and how much to cut
  - methods of harvest (e.g., clearcutting, shelter wood method) and logging (e.g., hand, mechanical)
  - regeneration and environmental protection.

Suggested Reference(s):

- *Alberta's Focus on Forests*
- *Our Growing Resource*
- *Managing the Forest*

STANDARD: Respond to a standard of 2 on the rating scale.

Rating Scale

The student:

4 meets project/task objectives in a self-directed manner. Provides explanations and critical judgements based on a superior knowledge base. Demonstrates an understanding of relevant concepts and related issues.

3 meets project/task objectives in a self-directed manner. Provides explanations and comparisons of relevant concepts using more precise terminology. Requires little or no prompting.

2 meets project/task objectives with limited assistance in planning and in selecting and using resources. Applies knowledge of concepts in different situations using correct terminology. Requires occasional prompting.

1 completes task as directed, demonstrating basic skills/completeness by following a guided course of action. Uses simple recall to demonstrate basic knowledge of concepts. Requires prompting.

0 does not complete the task, or is unable to provide a suitable response.

N/A Not Applicable

Background Information

See *Alberta's Focus on Forests*:

- Activity 4.6: Cutting Styles
- Activity 5.3: Forest Perspectives.

See *Managing the Forest:*

Harvest
- Logging Plans
- Forest roads
- Harvesting Methods
- Hazard Abatement - Slash Burning.

Sample Questions / Activities

1. **Define and give examples of allowable cut, sustained yield and integrated use within the context of forest harvest planning.**
2. **Explain applications of forest inventory data in establishing a plan for harvest;** e.g.:
   - identification of tree species
   - determining timber quality, volume and age
   - layout of cutting area and landing sites
   - planning for forest access
3. **Explain and illustrate the clear cutting, seed tree, shelter wood and selection methods of forest harvest.**
4. **Give examples of natural and artificial regeneration, and the advantages/disadvantages of each.**
5. **Identify environmental concerns to be addressed through harvest planning;** e.g.:
   - protection of sensitive areas
   - impact on downstream values
   - landslide and erosion hazards.

SAMPLE CHECKLIST: Forest Harvest Plans FOR2070–2

PLANNING COMPONENTS	YES	NO	N/A
Have block layout requirements been met?	☐	☐	
Has block size met operating ground rule guidelines?	☐	☐	
Have operability factors been considered?	☐	☐	
Has the condition of the timber been accounted for?	☐	☐	
Have deciduous and coniferous operations been integrated?	☐	☐	☐
Have utilization standards been considered?	☐	☐	
Is the method of harvest appropriate to the terrain?	☐	☐	
Do block boundaries follow natural breaks in topography, stand types, watershed divides, etc.?	☐	☐	
Is harvest sequence logical in volume to be removed at any cut, timing of the second cut, etc.?	☐	☐	
Have management objectives of other agencies been considered?			
• fisheries and wildlife	☐	☐	
• recreation	☐	☐	☐
• watershed	☐	☐	☐
Is the reforestation plan included?	☐	☐	
Is a plan for forest protection included?	☐	☐	
Have forest landscape management principles been applied?	☐	☐	

STANDARD IS 2 IN EACH APPLICABLE TASK

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence.

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively.

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately.

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately.

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

N/A Not Applicable

REFLECTIONS/COMMENTS

CLEARCUTTING

1. Give a definition of clearcutting.
   - *A method of reproducing even aged strands where all of the standing mature trees are cut at one time during a rotation.*
2. Give four examples of situations or conditions where clearcutting is the only feasible reproduction method to use.
   - *even aged, mature to over mature stands*
   - *shade intolerant species*
   - *on sites subject to windthrow*
   - *stand replacement, e.g.:*
     - *good phenotypes to replace poor phenotypes*
     - *change species composition*
   - *change to a regulated forest.*
3. Identify three advantages of using artificial regeneration with clearcutting.
   - *equipment and techniques in logging and site preparation are unrestricted*
   - *close control of composition and arrangement of new stand*
   - *superior genetic strains and species can be introduced*
   - *prompt regeneration.*
4. What are two disadvantages of using artificial regeneration with clearcutting?
   - *slash disposal is required*
   - *existing vegetation must be controlled before planting*
   - *may be a tendency toward a monoculture.*
5. Identify three conditions where it is advantageous to use artificial regeneration with clearcutting.
   - *where seed supply is not dependable*
   - *where it is desirable to change species composition*
   - *dense, mature forests where dominants are not windfirm*
   - *where silvicultural practice is intensive.*
6. What two conditions are essential if natural regeneration is to be used successfully with clearcutting?
   - *distribution of abundant seed supply over entire area*
   - *favourable environmental conditions for seed germination and development.*
7. What are two problems with relying on natural regeneration after clearcutting in a white spruce stand?
   - *delay in regeneration until there is a good seed crop and weather suitable for germination and survival*
   - *the delay in regeneration may result in development of ground vegetation which leads to an irregular aged stand.*
8. Identify the three modifications of the clearcutting method.
   - patch
   - alternate strip
   - progressive strip.
9. What is the minimum number of cutting operations in the progressive strip method?
   - *three.*
10. What are three biological advantages of the clearcutting method?
    - *appropriate for shade intolerant species*
    - *can change species composition*
    - *thorough site preparation is possible*
    - *options for regeneration include seed from standing timber, slash-borne cones and artificial regeneration*
    - *the only method to obtain successful regeneration from some species.*
11. List three considerations that come into play when planning size, form and arrangement of cuts for a clearcutting operation.
    - *ecological characteristics of the species*
    - *topography*
    - *road network*
    - *logging equipment.*
12. What are three advantages of progressive strip clearcutting over other forms of clearcutting?
    - *area to be artificially regenerated is smaller than with other methods*
    - *strip widths can be made narrow enough so natural regeneration takes place*
    - *reduction in potential losses from windthrow (the last strip is the most susceptible)*
    - *aesthetics are improved over other methods since volume harvested at any time is low.*
13. Identify two economic advantages of the clearcutting method.
    - *harvesting costs are low*
    - *simple and efficient administration, logging and silvicultural operations.*
14. What are three biological disadvantages of the clearcutting method?
    - *maximum degree of site exposure*
    - *slash hazard*
    - *require site preparation*
    - *all parts of a stand pass simultaneously through each stage of development.*

CLEARCUTTING (continued)

15. What are two economic disadvantages of the clearcutting method?
    - *cost of regeneration may be high*
    - *may not be a market for small sized wood*
    - *must wait one full rotation until the next harvest.*
16. What are three detrimental effects on fish populations when clearcutting right to the edge of stream banks?
    - *water temperatures rise adversely affecting the food supply of fish*
    - *situation of streams*
    - *debris can clog streams.*
17. Give three specific situations where clearcutting is the most appropriate method of cutting.
    - *where there are even aged over mature forests*
    - *where there are shade intolerant species*
    - *where sites are subject to windthrow*
    - *where poor phenotypes are to be replaced by good phenotypes or where species composition is to be changed.*
18. Clearcutting results in maximum site exposure. Identify three environmental factors associated with this exposure and indicate how each of these affects the chances for regeneration of tree seedlings.
    - *high radiation loads during day – heat injury*
    - *large diurnal temperature fluctuations – danger of freezing injury*
    - *high moisture stress – seedling desiccation*
    - *erosion of soil – seedlings washed out or buried*
    - *more wind – high evaporative stress.*
19. Give three reasons why harvesting costs are lower in clearcutting than with any other reproduction method.
    - *operations are concentrated*
    - *minimal road development*
    - *few restrictions on equipment*
    - *no tree marking.*

SEED TREE METHOD

20. Define what is meant by the seed tree reproduction method.
    - *A method to propagate even aged stands where essentially all mature trees are removed at one time with the retention of scattered trees (singly or in small groups) to serve as a seed source.*
21. In what two ways does the seed tree method differ from clearcutting?
    - *retention of scattered seed trees*
    - *seed supply from the scattered seed trees – more uniform seed distribution.*
22. Identify two situation or conditions where the seed tree method is appropriate.
    - *even aged stands*
    - *shade intolerant, windfirm trees with light, wind blown seed*
    - *where there are few restrictions on size and arrangement of cut areas.*
23. Identify four desirable characteristics for seed trees.
    - *must be windfirm*
    - *must produce abundant and fertile seed*
    - *must be a dominant (D) or a good codominant (CD)*
    - *good phenotype*
    - *desired species.*
24. What are two silvical advantages of the seed tree method over the clearcutting method?
    - *source of seed on very ha*
    - *good control of species composition and phenotypic characteristics.*
25. What are three economic advantages of the seed tree method over the clearcutting method?
    - *larger areas can be cut at one time*
    - *simple to apply since the only marking required is the seed trees*
    - *seed trees may be cut or left.*
26. Identify two disadvantages (economic or biological) of the seed tree method compared to the clearcutting method.
    - *seed source is exposed and there is risk of loss*
    - *some restrictions in logging.*
27. Why is the seed tree method not very commonly used now?
    - *The method was not properly applied (e.g., too few seed trees per ha left, trees lacked windfirmness, poor quality trees were left).*
28. Is the seed tree method desirable for the White Spruce and Lodgepole Pine species in Alberta? For each species answer yes or no and indicate why.

White Spruce	Lodgepole Pine
– *no, lacks windfirmness*	– *no, not ideal for serotinous coned populations, may be suitable for populations with nonserotinous cones.*

SHELTERWOOD METHOD

29 Give a definition of the shelterwood reproduction method. Be sure to indicate how the method differs from other reproduction methods.
- *This is a method to propagate even aged stands where two or more partial cuts are made in a mature stand over a relatively short period (<20%) of the rotation.*

30. The preparatory cutting is the first cut in a three-cut shelterwood. What are the two purposes for undertaking this cut?
- *open up the stand to enhance seed production*
- *allow more radiation to reach the forest floor and decompose thick organic horizons.*

31. What crown classes are removed in a preparatory cutting?
- *intermediate (I), overtopped or suppressed (O), poorly formed codominant (CD).*

32. What is the purpose of the seed cutting?
- *To further open up the stand and allow for establishment of regeneration.*

33. When should the seed cutting in the shelterwood method occur?
- *During a good seed year.*

34. What are two purposes for the removal cuttings in the shelterwood method?
- *uncover the new crop*
- *to remove overstorey which has increased in value.*

35. What is the prime factor that will determine when a removal cut (final cut) should be made?)
- *Condition of the regeneration, when regeneration is well established the final cut can be made.*

36. Identify four biological advantages of the shelterwood method.
- *best seed supply of even aged systems*
- *natural regeneration is more certain and complete*
- *best method for producing even aged stands of shade tolerant species*
- *light and heavy seeded species can be regenerated*
- *suitable for stands consisting of two or more species with different lengths of rotation*
- *reduced fire hazard*
- *less susceptible to insects and diseases.*

37. What are two biological disadvantages of the shelterwood method?
- *risk of windfall*
- *damage to regeneration during harvest*
- *damage to overstorey during harvest.*

38. The shelterwood method has a number of economic advantages. Identify two of them.
- *less waste than clearcutting*
- *overlap of rotations*
- *for sawlog material or high value product.*

39. What is one economic disadvantage of the shelterwood method?
- *harvesting is costly*
- *high cost of harvesting may be essential to obtain cheap natural regeneration.*

40. What is the purpose of the seed cutting in the shelterwood method? What three crown classes are removed in this cut?
- *Open up stand so regeneration can become established*
- *intermediate (I), overtopped or suppressed (O), many codominant (CD).*

41. Give three reasons why harvesting is more expensive with the shelterwood method than with clearcutting.
- *more restrictions on logging equipment*
- *tree marking is required*
- *more skilled personnel required*
- *more scattered operations*
- *same area logged more than once.*

42. Give two economic features (other than harvesting) which apply to the shelterwood method.
- *overlap or rotations*
- *cheap natural regeneration may be obtained.*

43. Identify five biological features of the shelterwood method.
- *best seed supply of even aged systems*
- *natural regeneration more certain and complete*
- *best method for producing even aged stands of shade tolerant species*
- *can regenerate light and heavy seeded species*
- *suitable for stands consisting of two or more species with different lengths of rotation*
- *lowered susceptibility to insects and disease*
- *fire hazard may be reduced*
- *risk of windfall*
- *damage to regeneration during harvest*
- *damage to overstory during harvest.*

SELECTION METHOD

44. Give a definition of the selection reproduction method.
    - *Mature timber in an uneven aged stand is removed as single, scattered trees or in small groups, at short intervals (cutting cycles) repeated indefinitely.*
45. identify three situations where the selection method would be appropriate to use.
    - *all aged or uneven aged stands*
    - *high value stands of sawtimber*
    - *areas of high danger for windfall and snow breakage*
    - *protection forests*
    - *parks where aesthetics are important.*
46. What is meant by the cutting cycle in the selection method?
    - *The number of years between successive cuts in the same stand.*
47. The selection method can be used in stands which have a J-shaped dbh class distribution. What is meant by a J-Shaped curve?
    - *This is a diameter distribution curve in a stand that has a large number of small diameter trees and a small number of large diameter trees.*
48. What is the minimum number of age classes in a stand suitable for the selection method?
    - *three.*
49. Why is it important to maintain a balance between the following components?
    A) growth
    B) harvested yield
    C) reproduction.
    - *If any component is reduced too severely, eventually the stand will have insufficient regeneration and sustained yield cannot be attained.*
50. Identify three characteristics that you might use in selecting trees to be harvested.
    - *trees larger than a specified dbh*
    - *age or size of trees*
    - *quality of trees*
    - *vigour of trees.*
51. Identify two economic advantages of the selection method.
    - *production and financial returns are continuous*
    - *financially attractive for farm woodlots*
    - *merchantable yield may be higher than with even aged methods.*
52. Identify five advantages of the selection reproduction method. Consider only the silvics of the tree species or stands.
    - *maximum site protection*
    - *continuous seed source*
    - *sell protected seedlings*
    - *reduced windfall hazard*
    - *minimized snow damage*
    - *minimized insect and disease damage*
    - *only method to maintain uneven aged stands*
    - *applicable to shade tolerant species*
    - *thin and harvest cut simultaneously*
    - *minimized fire hazard.*
53. What are two other advantages (exclude economics and silvics) of the selection method?
    - *enhanced aesthetics*
    - *improved wildlife habitat*
    - *fish habitat optimized.*
54. Give three reasons why harvesting costs with the selection method are higher than for any other reproduction method.
    - *operations are scattered*
    - *restrictions on choice of logging methods and equipment*
    - *each area must be logged a number of times*
    - *skilled personnel are needed for marking, felling and extraction.*
55. Indicate two other economic disadvantages of the selection method.
    - *restricted to situations where there is a market for large size, high value trees*
    - *danger of high grading*
    - *complicated administration.*
    - *danger of high grading*
    - *complicated administration.*
56. What is one advantage for stream fish when the selection method of harvesting is used?
    - *streams are shaded to water temperature does not rise*
    - *no debris in steam to clog channel*
    - *bank damage is minimized so siltation is reduced.*
57. Identify two advantages for deer when the selection method of timer harvest is used.
    - *edge effect is maximized*
    - *feeding areas (open) in proximity to hiding and thermal cover.*

RESEARCH PROCESS: Fibre Utilization and Product Formation FOR2070–4

TASK	OBSERVATION/RATING					
Preparation and Planning	4	3	2	1	0	N/A
Information Gathering and Processing	4	3	2	1	0	N/A
Content	4	3	2	1	0	N/A
Collaboration and Teamwork	4	3	2	1	0	N/A
Information Sharing	4	3	2	1	0	N/A

STANDARD IS 2 IN EACH APPLICABLE TASK

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence.

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively.

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately.

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately.

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

N/A Not Applicable

TASK CHECKLIST

The student:

Preparation and Planning

☐ sets goals and establishes steps to achieve them
☐ creates and adheres to useful timelines
☐ uses personal initiative to formulate questions and find answers
☐ plans and uses time effectively

Information Gathering and Processing

☐ accesses a range of relevant in-school/community resources
☐ uses a range of information-gathering techniques
☐ interprets, organizes and combines information into a logical sequence
☐ records information accurately with appropriate supporting detail and using correct technical terms
☐ determines accuracy/currency/reliability of information sources
☐ gathers and responds to feedback regarding approach to the task

Content

☐ outlines major categories/types of forest products, and examples of consumer products within each category; e.g.:
  - pulp and paper
  - lumber
  - veneer and plywood
  - board products
  - chemical and medicinal products

Content (continued)

☐ explains the steps and processes involved in converting a log into:
  - lumber
  - pulp
  - one other forest product
☐ provides a summary of new developments in milling and pulping technology
☐ provides a list of safety regulations pertinent to a sawmill and/or a pulp mill
☐ ______________________________
____
☐ ______________________________
____

Collaboration and Teamwork

☐ cooperates with group members
☐ shares work appropriately among group members
☐ negotiates solutions to problems

Information Sharing

☐ demonstrates effective use of two or more communication media:
e.g., written, oral, audio-visual
☐ communicates ideas in a logical sequence with sufficient supporting detail
☐ maintains acceptable grammatical and technical standards
☐ cites five or more relevant information sources

REFLECTIONS/COMMENTS:

KNOWLEDGE/APPLICATION ASSESSMENT: Forest Management Goals FOR2100-1

Assessment Criteria and Conditions:

- developing a rationale for forest management in Alberta that involves:
  - identifying economic, environmental and social needs addressed through forest management
  - definitions and examples of sustainable development, sustained yield and allowable cut

Suggested Reference(s):

- *Our Growing Resource*
- *Alberta's Focus on Forests*
- *Managing the Forest*

STANDARD: Respond to a standard of 2 on the rating scale.

Rating Scale

The student:

4 meets project/task objectives in a self-directed manner. Provides explanations and critical judgements based on a superior knowledge base. Demonstrates an understanding of relevant concepts and related issues.

3 meets project/task objectives in a self-directed manner. Provides explanations and comparisons of relevant concepts using more precise terminology. Requires little or no prompting.

2 meets project/task objectives with limited assistance in planning and in selecting and using resources. Applies knowledge of concepts in different situations using correct terminology. Requires occasional prompting.

1 completes task as directed, demonstrating basic skills/completeness by following a guided course of action. Uses simple recall to demonstrate basic knowledge of concepts. Requires prompting.

0 does not complete the task, or is unable to provide a suitable response.

N/A Not Applicable

Background Information

See *Our Growing Resource*, Chapter 2 – The Challenge of Sustainable Development:

- Managing Forest Development
- Integrated Resource Management – Accommodating Many Uses
- Harvest Planning and Practices
- Reforestation
- Air and Water Quality
- Building Sustainable Businesses.

See *Alberta's Focus on Forests*, Unit 5 – Forest Management for All:

- 5.1: Forest Values
- 5.2: Decision for Change
- 5.3: Forest Perspectives
- 5.4: Reforestation: Forests or Tree Farms?
- 5.5: Integrated Resource Management
- 5.6: What's in the Wastebasket – Reassessing Our Needs

Sample Questions/Activities

1. **Explain the goals of "sustainable development," "sustainable yield" and "allowable cut" within the context of Alberta's forests.**
2. **Discuss the meaning of the following definition of sustainable forest management:**
   "the development of forests to meet current needs without prejudice to their future productivity, ecological diversity, or capacity for regeneration."
3. **Identify and explain major components/ considerations in sustainable forest management;** e.g.:
   - timber resources
   - biodiversity of wildlife
   - air, land and water quality.
4. **Identify two or more economic, environmental and social needs addressed through the management of forested lands in Alberta.**
5. **Interview representatives of three or more different forest industry organizations regarding their approach to sustainable forest management;** e.g.:
   - priorities
   - actions.
6. **Identify current research projects underway that are intended to support sustainable forestry practices.**

ISSUE ANALYSIS: Forest Use FOR2100–2

TASK	OBSERVATION/RATING					
Preparation and Planning	4	3	2	1	0	N/A
Analyzing Perspectives	4	3	2	1	0	N/A
Collaboration and Teamwork	4	3	2	1	0	N/A
Evaluating Choices/Making Decisions	4	3	2	1	0	N/A

STANDARD IS 2 IN EACH APPLICABLE TASK

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence.

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively.

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately.

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately.

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

N/A Not Applicable

TASK CHECKLIST

The student:

Preparation and Planning

☐ accurately describes ten or more current uses/values of Alberta's forests

☐ poses thoughtful questions regarding each forest use/value

☐ accesses a range of relevant information sources and recognizes when additional information is required

☐ demonstrates resourcefulness in collecting data

Analyzing Perspectives

☐ categorizes the views of different interest groups regarding three or more types of forest use;
e.g., cultural, ethical, economic, environmental, health-related, scientific, political

☐ states a position on one issue regarding forest use, and insightful reasons for adopting that position

☐ states two or more opposing positions on the issue and thoughtful reasons for adopting each position

☐ analyzes interrelationships among different perspectives/points of view

☐ recognizes underlying bias/assumptions/values in information and ideas

Collaboration and Teamwork

☐ shares work appropriately among group members

☐ respects and considers the views of others

☐ negotiates with sensitivity solutions to problems regarding forest use

Evaluating Choices/Making Decisions

☐ describes in detail important and appropriate alternatives regarding one type of forest use

☐ establishes knowledge- and value-based criteria for assessing each alternative:
e.g., social, economic, environmental

☐ selects an appropriate and useful alternative by showing differences among choices

☐ assesses strengths/weaknesses of decisions by considering consequences and implications for:
- forest users
- forest ecosystems

☐ develops strategies for compromise and/or conflict resolution among different forest users/interest groups

☐ communicates thoughts/feelings/ideas clearly to justify choices/decisions made

REFLECTIONS/COMMENTS:

RESEARCH PROCESS: Forest Management Practices FOR2100–3

TASK	OBSERVATION/RATING					
Preparation and Planning	4	3	2	1	0	N/A
Information Gathering and Processing	4	3	2	1	0	N/A
Content	4	3	2	1	0	N/A
Collaboration and Teamwork	4	3	2	1	0	N/A
Information Sharing	4	3	2	1	0	N/A

STANDARD IS 2 IN EACH APPLICABLE TASK

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence.

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively.

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately.

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately.

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

N/A Not Applicable

TASK CHECKLIST

The student:

Preparation and Planning

☐ sets goals and establishes steps to achieve them
☐ creates and adheres to useful timelines
☐ uses personal initiative to formulate questions and find answers
☐ plans and uses time effectively

Information Gathering and Processing

☐ accesses a range of relevant in-school/community resources
☐ uses a range of information-gathering techniques
☐ interprets, organizes and combines information into a logical sequence
☐ records information accurately with appropriate supporting detail and using correct technical terms
☐ determines accuracy/currency/reliability of information sources
☐ gathers and responds to feedback regarding approach to the task

Content

☐ defines and gives examples of conservation and preservation within the context of forest management
☐ cites instances where differences in philosophy have affected forest management and protection
☐ explains the mandates of five or more agencies responsible for managing Alberta's forested lands; e.g.:
  - Alberta Forest Service
  - Fish and Wildlife Services

Content (continued)

☐ explains the intent of four or more different agreements, permits and/or licences that make Alberta's forests available for commercial or private use; e.g.:
  - forest management agreements
  - quota certificates
  - commercial/private timber permits

☐ identifies factors likely to influence future forest management practices; e.g.:
  - knowledge/technology
  - recreation and tourism

☐ ______________________________
____
☐ ______________________________
____

Collaboration and Teamwork

☐ cooperates with group members
☐ shares work appropriately among group members
☐ negotiates solutions to problems

Information Sharing

☐ demonstrates effective use of two or more communication media:
e.g., written, oral, audio-visual
☐ communicates ideas in a logical sequence with sufficient supporting detail
☐ maintains acceptable grammatical and technical standards
☐ cites five or more relevant information sources

REFLECTIONS/COMMENTS:

KNOWLEDGE/APPLICATION ASSESSMENT: Users in the Forest FOR2120–1

Assessment Criteria and Conditions:

- identifying four or more major categories of forest use (e.g., industry, recreation, tourism, environmental) and examples of forest users within each category

Suggested Reference(s):

- *Alberta's Focus on Forests*
- *Woodlot Management Guide for the Prairie Provinces*

STANDARD: **Respond to a standard of 2 on the rating scale.**

Rating Scale

The student:

4 meets project/task objectives in a self-directed manner. Provides explanations and critical judgements based on a superior knowledge base. Demonstrates an understanding of relevant concepts and related issues.

3 meets project/task objectives in a self-directed manner. Provides explanations and comparisons of relevant concepts using more precise terminology. Requires little or no prompting.

2 meets project/task objectives with limited assistance in planning and in selecting and using resources. Applies knowledge of concepts in different situations using correct terminology. Requires occasional prompting.

1 completes task as directed, demonstrating basic skills/completeness by following a guided course of action. Uses simple recall to demonstrate basic knowledge of concepts. Requires prompting.

0 does not complete the task, or is unable to provide a suitable response

N/A Not Applicable

Background Information

See *Alberta's Focus on Forests*, Unit 5 - Forest Management for All:

- 5.1: Forest Values
- 5.2: Decision for Change
- 5.3: Forest Perspectives
- 5.4: Reforestation: Forests or Tree Farms?
- 5.5: Integrated Resource Management
- 5.6: What's in the Wastebasket - Reassessing Our Needs

See *Woodlot Management Guide for the Prairie Provinces:*

- Section G: Wildlife and Woodlots
- Section H: Recreation
- Section J: Agroforestry

Sample Questions/Activities

1. **Identify major categories of forest use and different forest users within each category;** e.g.:
   - industrial
   - recreational
   - tourism
   - agriculture
   - environmental
2. **Describe a range of specific forest uses and multiple demands placed upon forested lands;** e.g.:
   - wood fibre production
   - wildlife management
   - grazing and range management
   - watershed
   - oil, gas and mining
   - recreation
   - protected areas
3. **Explain why forests can and should serve many purposes.**
4. **Cite examples of the multiple use of Alberta's forests;** e.g.:
   - using different parts of the forest for different purposes
   - using the same area of the forest to obtain more than one benefit.
5. **Interview representatives of three or more different forest industry organizations regarding their approach to multiple use of forested lands;** e.g.:
   - priorities
   - actions.

RESEARCH PROCESS: Multiple and Integrated Land Use FOR2120–2

TASK	OBSERVATION/RATING					
Preparation and Planning	4	3	2	1	0	N/A
Information Gathering and Processing	4	3	2	1	0	N/A
Content	4	3	2	1	0	N/A
Collaboration and Teamwork	4	3	2	1	0	N/A
Information Sharing	4	3	2	1	0	N/A

STANDARD IS 2 IN EACH APPLICABLE TASK

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence.

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively.

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately.

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately.

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

N/A Not Applicable

TASK CHECKLIST

The student:

Preparation and Planning

☐ sets goals and establishes steps to achieve them
☐ creates and adheres to useful timelines
☐ uses personal initiative to formulate questions and find answers
☐ plans and uses time effectively

Information Gathering and Processing

☐ accesses a range of relevant in-school/community resources
☐ uses a range of information-gathering techniques
☐ interprets, organizes and combines information into a logical sequence
☐ records information accurately with appropriate supporting detail and using correct technical terms
☐ determines accuracy/currency/reliability of information sources
☐ gathers and responds to feedback regarding approach to the task

Content

☐ explains why forests can and should simultaneously serve social, economic and environmental goals
☐ provides a definition of multiple land use, and cites examples of the multiple use of Alberta's forests; e.g.:
  - using different parts of the forest for different purposes
  - using the same area of the forest at different times to obtain more than one benefit

Content (continued)

☐ provides a definition of integrated land use, and cites examples in Alberta where a common area of forested land serves two or more purposes at the same time; e.g.:
  - wood fibre production and wildlife management
  - grazing, oil production and recreation
☐ compares and contrasts principles of multiple land use with principles of integrated land use
☐ explains the goals of Integrated Resource Planning (IRP)
☐ ________________________________
____
☐ ________________________________
____

Collaboration and Teamwork

☐ cooperates with group members
☐ shares work appropriately among group members
☐ negotiates solutions to problems

Information Sharing

☐ demonstrates effective use of two or more communication media:
e.g., written, oral, audio-visual
☐ communicates ideas in a logical sequence with sufficient supporting detail
☐ maintains acceptable grammatical and technical standards
☐ cites five or more relevant information sources

REFLECTIONS/COMMENTS:

Analyzing Issues	Minimum Level of Performance 3	Observed Level of Performance

The student:

- ☐ analyzes five current issues in forest management:
  - – accurately describes each issue
  - – clarifies different points of view regarding each issue *e.g., social, economic, environmental*
  - – identifies two or more useful alternatives regarding each issue
  - – assesses each alternative on the basis of immediate/long-term consequences
- ☐ critiques one newspaper/magazine article or video documentary regarding an issue in forest management with respect to:
  - – range of viewpoints/biases evident
  - – validity/reliability of information presented
  - – recommended course of action

See assessment tools generic to CTS:
Assessment Framework: Issue Analysis (CTSISS)
Guide to Critiquing Media Information (FORMED)

Comparing Local and Global Issues	Minimum Level of Performance 3	Observed Level of Performance

The student:

- ☐ accurately describes one international forest issue
- ☐ compares the international issue with a similar forest issue in Canada
- ☐ suggests two or more strategies/actions for dealing with the issue at local and global levels
- ☐ assesses each strategy/action on the basis of consequences for society, the economy and the environment

See assessment tools generic to CTS:
Assessment Framework: Research Process (CTSRES)

Citizenship: Goals and Actions	Minimum Level of Performance 3	Observed Level of Performance

The student:

- ☐ explains different philosophies/ethics regarding the use of forests and how best to ensure their sustainability
- ☐ summarizes the goals and accomplishments of one environmental conservation group
- ☐ negotiates and debates one current issue in forest management:
  - – clearly states a position on the issue
  - – presents a convincing argument in logical sequence supporting the position
  - – provides a relevant and convincing rebuttal to opposing arguments
  - – develops a shared agreement on preferred alternatives
- ☐ through group consensus building, proposes a plan for the conservation and management of forested regions that includes individual actions, shared actions and leadership roles

See assessment tools generic to Forestry:
Negotiation and Debate (FORNEG–3)

Managing Learning	Minimum Level of Performance 3	Observed Level of Performance

The student:

- ☐ sets clear goals and establishes steps to achieve them
- ☐ uses personal initiative to formulate questions and find answers
- ☐ demonstrates resourcefulness in gathering information
- ☐ plans and uses time effectively, prioritizing tasks on a consistent basis
- ☐ assesses and refines approach to task/project based on feedback and reflection

Research and Communication	**Minimum Level of Performance 3**	**Observed Level of Performance**
The student: ☐ accesses a range of relevant information sources and recognizes when additional information is required ☐ interprets, organizes and combines information in creative and thoughtful ways ☐ recognizes underlying bias/assumptions/values in information and ideas ☐ demonstrates effective use of a variety of communication media: *e.g., written, oral, multimedia* ☐ communicates thoughts/feelings/ideas clearly to justify or challenge a position ☐ maintains acceptable grammatical and technical standards through proofreading and editing ☐ gives evidence of adequate information gathering by citing relevant information sources		

Collaboration, Teamwork and Ethics	**Minimum Level of Performance 3**	**Observed Level of Performance**
The student: ☐ works with a range of peer members ☐ shares information/opinions/suggestions, maintaining a balance between speaking and listening ☐ listens to and respects the views of others, requesting clarification as necessary from other group members ☐ negotiates with sensitivity solutions to problems ☐ assesses the consequences of personal/group actions on society and the environment		

RATING SCALE	**4** Meets project/task objectives in a self-directed manner, selecting and implementing the most appropriate course of action. Problems are solved in effective and creative ways. Quality and productivity exceed standards.	**3** Meets project/task objectives in a self-directed manner, selecting and using resources/processes efficiently and effectively. No errors or deficiencies are noted. Quality and productivity consistently meet standards.	**2** Meets project/task objectives with limited assistance in planning, solving problems and in selection and use of resources/ processes. Only minor errors/deficiencies are noted. Quality and productivity meet standards, but are occasionally inconsistent.	**1** Completes task as directed, demonstrating basic skills/completeness by following a guided course of action. Quality and productivity meet standard but are inconsistent.	**0** Has not yet completed the task. Major deficiencies and/or errors are evident.

KNOWLEDGE/APPLICATION ASSESSMENT: Forest Survey Data FOR3060–1

Assessment Criteria and Conditions:

- identifying and explaining applications of timber cruise data and nonfibre data in resource management
- demonstrate applications of a sample set of forest survey data

Suggested Reference(s):

- *Managing the Forest*
- *Woodlot Management Guide for the Prairie Provinces*
- *Natural Resources Measurements*
- *Forest Mensuration*

STANDARD: Respond to a standard of 3 on the rating scale.

Rating Scale

The student:

4 meets project/task objectives in a self-directed manner. Provides explanations and critical judgements based on a superior knowledge base. Demonstrates an understanding of relevant concepts and related issues.

3 meets project/task objectives in a self-directed manner. Provides explanations and comparisons of relevant concepts using more precise terminology. Requires little or no prompting.

2 meets project/task objectives with limited assistance in planning and in selecting and using resources. Applies knowledge of concepts in different situations using correct terminology. Requires occasional prompting.

1 completes task as directed, demonstrating basic skills/completeness by following a guided course of action. Uses simple recall to demonstrate basic knowledge of concepts. Requires prompting.

0 does not complete the task, or is unable to provide a suitable response.

N/A Not Applicable

Background Information

See *Managing the Forest*, Inventory:

- Timber Inventory
- What Tree is That?
- Grouping Trees
- What is a Tree?
- Tree Growth
- Measurement Activities
- Maps
- Air Photographs

See *Woodlot Management Guide for the Prairie Provinces*, Section F – Inventory:

- Steps to Conduct an Inventory
- Maps
- Cruising
- Designing a Cruise
- Measuring Cruise Plots
- Plot Sizes
- Measuring Tree Diameter
- Measuring Tree Age
- Measuring Tree Height
- Processing Cruise Data
- Sample Compilation

Sample Questions/Activities

1. **Discuss applications of timber cruise data in resource management;** e.g.:
   - estimating fibre volumes
   - projecting forest growth
   - planning harvest operations.
2. **Perform mathematical calculations to determine timber volumes for a sample forested area.**
3. **Explain applications of nonfibre data in resource management;** e.g.:
   - measures of water and soil quality
   - watershed potential
   - number and density of wildlife.
4. **Discuss potential applications of sample nonfibre data obtained from local government/industry.**
5. **Interpret a set of sample forest survey data;** e.g.:
   - consider bias, error and other limitations in the sample data
   - extrapolate the data to estimate forest populations
   - suggest applications of the data in resource management
   - suggest modifications to sample design that may increase accuracy of the survey.
6. **Research applications of computer software in processing forest survey data.**

RESEARCH PROCESS: Role of Technology in Forest Inventory FOR3060–2

TASK	OBSERVATION/RATING					
Preparation and Planning	4	3	2	1	0	N/A
Information Gathering and Processing	4	3	2	1	0	N/A
Content	4	3	2	1	0	N/A
Collaboration and Teamwork	4	3	2	1	0	N/A
Information Sharing	4	3	2	1	0	N/A

STANDARD IS 3 IN EACH APPLICABLE TASK

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence.

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively.

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately.

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately.

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

N/A Not Applicable

TASK CHECKLIST

The student:

Preparation and Planning

☐ sets clear goals and establishes steps to achieve them
☐ creates and adheres to detailed timelines
☐ uses personal initiative to formulate questions and find answers
☐ plans and uses time effectively, prioritizing tasks on a consistent basis

Information Gathering and Processing

☐ accesses a range of relevant information sources and recognizes when additional information is required
☐ demonstrates resourcefulness in collecting data
☐ interprets, organizes and combines information in creative and thoughtful ways
☐ records information accurately with appropriate supporting detail and using correct technical terms
☐ recognizes underlying bias/assumptions/values in information sources
☐ assesses and refines approach to the task and project status based on feedback and reflection

Content

☐ explains applications of aerial photography in current data collection practices
☐ interprets information regarding the forest resource in one or more aerial photographs
☐ ______________________________

Content (continued)

☐ explains applications of satellite imagery in current data collection practices
☐ interprets one or more satellite images used in forest inventory
☐ ______________________________
☐ explains applications of one or more computer-based mapping systems in data manipulation and/or data storage
☐ ______________________________

Collaboration and Teamwork

☐ cooperates with group members
☐ shares work appropriately among group members
☐ negotiates with sensitivity solutions to problems
☐ displays effective communication and leadership skills

Information Sharing

☐ demonstrates effective use of a variety of communication media:
e.g., *written, oral, audio-visual*
☐ communicates thoughts/feelings/ideas clearly to justify or challenge a position
☐ maintains acceptable grammatical and technical standards
☐ gives evidence of adequate information gathering by citing seven or more relevant information sources

REFLECTIONS/COMMENTS:

BEST COPY AVAILABLE

KNOWLEDGE/APPLICATION ASSESSMENT: Forest Products and Services FOR3070–1

Assessment Criteria and Conditions:

- given a range of relevant in-school/community resources, identifying and describing:
  - fibre and nonfibre products and services derived from Alberta's forests
  - forecasts regarding the future use of forests in Alberta and Canada

Suggested Reference(s):

- *Alberta's Focus on Forests*
- *Our Growing Resource*
- *Woodlot Management Guide for the Prairie Provinces*

STANDARD: Respond to a standard of 3 on the rating scale.

Rating Scale

The student:

4 meets project/task objectives in a self-directed manner. Provides explanations and critical judgements based on a superior knowledge base. Demonstrates an understanding of relevant concepts and related issues.

3 meets project/task objectives in a self-directed manner. Provides explanations and comparisons of relevant concepts using more precise terminology. Requires little or no prompting.

2 meets project/task objectives with limited assistance in planning and in selecting and using resources. Applies knowledge of concepts in different situations using correct terminology. Requires occasional prompting.

1 completes task as directed, demonstrating basic skills/completeness by following a guided course of action. Uses simple recall to demonstrate basic knowledge of concepts. Requires prompting.

0 does not complete the task, or is unable to provide a suitable response.

N/A Not Applicable

Background Information

See *Alberta's Focus on Forests*, Unit 4 – Forest Resources and Technologies:

- 4.2: Products from Canada's Forests
- 4.3: Surveying the Forest Resource
- 4.4: From Pulp to Paper
- 4.5: Pulp and Paper: The Technology-Environment Connection.

See *Our Growing Resource*, Chapter 3: Production and Products – Today's Forest Industry:

- Lumber
- Panelboard
- Pulp and Paper.

See *Woodlot Management Guide for the Prairie Provinces*, Section III – Products/Markets:

- Fibre Markets
- Energy
- Christmas Trees
- Food.

Sample Questions/Activities

1. **Identify 20 or more fibre-based products and services derived from Alberta's forests;** e.g.:
   - primary wood products
   - wood-fabricated products
   - pulp and paper products
   - chemical products
   - food products.
2. **Identify 10 or more nonfibre values derived from Alberta's forests;** e.g.:
   - trapping, hunting and fishing
   - guiding and outfitting
   - tourism and recreational pursuits
   - ecological values
   - aesthetic and spiritual values.
3. **Describe trends in the consumptive and nonconsumptive use of forests in Canada and Alberta;** e.g.:
   - recreation
   - trapping
   - logging
   - oil and gas development.
4. **Given a selected forest region, identify a range of forest products and services that could be derived from that site.**
5. **Identify a range of common products derived from a given tree species.**

RESEARCH PROCESS: Milling and/or Pulping Technology FOR3070–2

TASK	OBSERVATION/RATING					
Preparation and Planning	4	3	2	1	0	N/A
Information Gathering and Processing	4	3	2	1	0	N/A
Content	4	3	2	1	0	N/A
Collaboration and Teamwork	4	3	2	1	0	N/A
Information Sharing	4	3	2	1	0	N/A

STANDARD IS 3 IN EACH APPLICABLE TASK

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence.

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively.

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately.

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately.

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

N/A Not Applicable

TASK CHECKLIST

The student:

Preparation and Planning

☐ sets clear goals and establishes steps to achieve them
☐ creates and adheres to detailed timelines
☐ uses personal initiative to formulate questions and find answers
☐ plans and uses time effectively, prioritizing tasks on a consistent basis

Information Gathering and Processing

☐ accesses a range of relevant information sources and recognizes when additional information is required
☐ demonstrates resourcefulness in collecting data
☐ interprets, organizes and combines information in creative and thoughtful ways
☐ records information accurately with appropriate supporting detail and using correct technical terms
☐ recognizes underlying bias/assumptions/values in information sources
☐ assesses and refines approach to the task and project status based on feedback and reflection

Content

☐ identifies, describes and sequences the steps/processes that are involved in one milling or pulping technology
☐ identifies materials and services that are required at each stage of production; e.g.:
  – human and natural resources
  – energy and technologies
  – inspection and regulation

Content (continued)

☐ describes products and/or services made available through applications of the milling or pulping technology
☐ develops a flow chart of steps and processes involved in the production process
☐ identifies potential affects of the milling or pulping process on the environment, and precautions taken by industry to eliminate/minimize environmental impact
☐ ______________________________

Collaboration and Teamwork

☐ cooperates with group members
☐ shares work appropriately among group members
☐ negotiates with sensitivity solutions to problems
☐ displays effective communication and leadership skills

Information Sharing

☐ demonstrates effective use of a variety of communication media:
e.g., *written, oral, audio-visual*
☐ communicates thoughts/feelings/ideas clearly to justify or challenge a position
☐ maintains acceptable grammatical and technical standards
☐ gives evidence of adequate information gathering by citing seven or more relevant information sources

REFLECTIONS/COMMENTS:

ASSESSMENT CRITERIA: A Marketing Plan FOR3070–3

RATING	ASSESSMENT CRITERIA
	The student:
4 3 2 1 0	**Schedules Tasks** ☐ defines the task ☐ identifies task components and organizes them into a logical sequence ☐ uses time effectively ☐ ______________________________
4 3 2 1 0	**Gathers Relevant Information** ☐ poses important questions regarding potential customers/markets ☐ accesses basic in-school/community information sources regarding the product/service and potential customers/markets ☐ interprets and organizes information into a logical sequence ☐ ______________________________
4 3 2 1 0	**Develops the Plan** ☐ describes the product/service and marketing goals ☐ assesses consumer preferences, and how these may be met through product diversification/specialization ☐ identifies potential markets in North America, the Pacific Rim, Europe and two other selected regions ☐ outlines the sequence of steps, materials, and processes involved in product/service development ☐ establishes a pricing strategy based on market analysis and cost factors ☐ establishes a packaging/labelling, advertising and promotion strategy consistent with marketing goals and consumer preferences ☐ summarizes opportunities and challenges relevant to the marketing plan ☐ ______________________________
4 3 2 1 0	**Assesses and Communicates the Plan** ☐ presents marketing plans in a logical sequence using two or more communication media ☐ uses correct grammar and technical terms ☐ predicts the likelihood of suggested outcomes/sales being realized ☐ makes summative statements regarding strengths/weaknesses and general feasibility of the marketing plan ☐ ______________________________

STANDARD IS 3 IN EACH APPLICABLE TASK

Rating Scale

The student:

4	exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence.
3	meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively.
2	meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately.
1	meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately.
0	has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.
N/A	Not Applicable

REFLECTIONS / COMMENTS

FOREST TECHNOLOGY APPLICATIONS FOR3080–1

Industry Research	Minimum Level of Performance 3	Observed Level of Performance

The student:

- ☐ identifies six or more types of forest research being conducted in Canada
- ☐ explains the role of the Alberta Forest Research Advisory Council in coordinating forest research activities in Alberta
- ☐ explains applications of data banks and information systems in forest research
- ☐ summarizes one current forest research project in Canada with respect to:
  - research objectives and participating agencies
  - information-gathering strategies
  - project status and implications for forest industry

See assessment tools generic to Forestry:
Presentations/Reports (FORPRE-3)

Technology Applications	Minimum Level of Performance 3	Observed Level of Performance

The student:

- ☐ identifies applications of technology in six or more sectors of the forest industry (e.g., inventory, silviculture, protection, harvest, processing, management)
- ☐ analyzes three technologies currently used in the forest industry by identifying:
  - specific problems/needs being addressed
  - basic components and principles of operation
  - benefits and costs with respect to social/economic/environmental factors
- ☐ describes one or more emerging technologies in the forest industry and needs being addressed

See assessment tools generic to CTS:
Assessment Framework: Research Process (CTSRES)

Technology Careers	Minimum Level of Performance 3	Observed Level of Performance

The student:

- ☐ identifies occupational opportunities within six career clusters related to forest technology (e.g., inventory, silviculture, protection, harvest, processing, management)
- ☐ describes employment conditions and requirements within one career cluster (e.g., job description/working conditions, remuneration, entry requirements, training opportunities, potential for advancement/entrepreneurship)
- ☐ makes forecasts regarding career trends in forest technology, future occupational opportunities and related employment conditions and requirements

See assessment tools generic to Forestry:
Career Search: Advanced Level (FORCAR-3)

Managing Learning	Minimum Level of Performance 3	Observed Level of Performance

The student:

- ☐ sets clear goals and establishes steps to achieve them
- ☐ uses personal initiative to formulate questions and find answers
- ☐ plans and uses time effectively, prioritizing tasks on a consistent basis
- ☐ assesses and refines approach to task/project based on feedback and reflection

Research and Communication	**Minimum Level of Performance** **3**	**Observed Level of Performance**

The student:

- ☐ accesses a range of relevant information sources and recognizes when additional information was required
- ☐ interprets, organizes and combines information in creative and thoughtful ways
- ☐ records information accurately with appropriate supporting detail and using correct technical terms
- ☐ demonstrates effective use of a variety of communication media: *e.g., written, oral, multimedia*
- ☐ maintains acceptable grammatical and technical standards through proofreading and editing
- ☐ gives evidence of adequate information gathering by citing relevant information sources

Collaboration and Teamwork	**Minimum Level of Performance** **3**	**Observed Level of Performance**

The student:

- ☐ cooperates with group members
- ☐ shares work appropriately among group members
- ☐ negotiates solutions to problems
- ☐ displays effective communication and leadership skills

RATING SCALE	**4** Exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence.	**3** Meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively.	**2** Meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately.	**1** Meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately.	**0** Has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

SAMPLE RESEARCH TOPICS: Technology Application FOR3080–2

SILVICULTURE

- biotechnology
- scarification
- vegetation control
-
-
-

FOREST INVENTORY/PROTECTION

- laser disc technology
- Geographic Information Systems (GIS)
- Global Positioning Systems (GPS)
-
-
-

GREEN HOUSE AND NURSERY OPERATIONS

- container systems
- environmental control systems
- packaging and storage systems
-
-
-

FOREST HARVEST

- feller bunchers
- delimbers
- on-site chipping
- on-board computer control systems
-
-

WOOD PRODUCTION AND UTILIZATION

- lasers in sawmills
- pulping technology
- computer process control
-
-
-

FOREST MANAGEMENT

- satellite imagery
- aerial photography
-
-
-
-

KNOWLEDGE/APPLICATION ASSESSMENT: Soil, Air and Water Characteristics FOR3090–1

Assessment Criteria and Conditions:

- identifying and describing:
  - organic and inorganic components of forest soils and their function in forest ecosystems
  - major types of air pollutants and their affect on forest ecosystems

Suggested Reference(s):

- *Alberta's Focus on Forests*
- *Woodlot Management Guide for the Prairie Provinces*

STANDARD: Respond to a standard of 3 on the rating scale.

Rating Scale

The student:

4 meets project/task objectives in a self-directed manner. Provides explanations and critical judgements based on a superior knowledge base. Demonstrates an understanding of relevant concepts and related issues.

3 meets project/task objectives in a self-directed manner. Provides explanations and comparisons of relevant concepts using more precise terminology. Requires little or no prompting.

2 meets project/task objectives with limited assistance in planning and in selecting and using resources. Applies knowledge of concepts in different situations using correct terminology. Requires occasional prompting.

1 completes task as directed, demonstrating basic skills/completeness by following a guided course of action. Uses simple recall to demonstrate basic knowledge of concepts. Requires prompting.

0 does not complete the task, or is unable to provide a suitable response.

N/A Not Applicable

Background Information

See *Alberta's Focus on Forests*, Unit 3 – Conditions Affecting Growth:

- 3.1: A Lot Depends on Location
- 3.2: Life History of a Tree
- 3.3: Woodland Whodunit
- 3.4: Forests: Thriving or Declining
- 3.5: Controlling Fire
- 3.6: Urban Wilderness at School.

See *Woodlot Management Guide for the Prairie Provinces*, Section I – Woodlot Assessment:

- Forest Ecology
- Ecological Areas
- Soils
- Tree Species.

Sample Questions/Activities

1. **Describe physical characteristics used to classify forest soils, and the effect of different soils on plant growth;** e.g.:
   - texture
   - porosity.
2. **Explain the function or organic and inorganic components of forest soils;** e.g.:
   - micro- and macro-organisms
   - gases and minerals
   - organic matter
   - water.
3. **Explain the effects of soil acidity, alkalinity and temperature on the growth of trees and other forest plants.**
4. **Describe indicators of water quality in the forest, and its effects on trees and other plants;** e.g.:
   - surface water
   - ground water.
5. **Describe the effects of known air pollutants on forest ecosystems;** e.g.:
   - ozone
   - particulate matter
   - oxides and nitrogen
   - sulphur dioxide.

FIELD INVESTIGATIONS: Soil, Air and Water Characteristics FOR3090–2

TASK	OBSERVATION/RATING					
Management	4	3	2	1	0	N/A
Teamwork	4	3	2	1	0	N/A
Equipment and Materials	4	3	2	1	0	N/A
Investigative Techniques	4	3	2	1	0	N/A

STANDARD IS 3 IN EACH APPLICABLE TASK

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence.

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively.

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately.

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately.

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

N/A Not Applicable

TASK CHECKLIST

The student:

Management
- ☐ prepares self for task
- ☐ organizes and works in an orderly manner
- ☐ interprets and carries out instructions accurately
- ☐ plans and uses time effectively in a logical sequence
- ☐ displays leadership in adhering to routine procedures
- ☐ attempts to solve problems prior to requesting help

Teamwork
- ☐ cooperates with group members
- ☐ shares work appropriately among group members
- ☐ negotiates with sensitivity solutions to problems
- ☐ displays effective communication skills

Equipment and Materials
- ☐ independently selects and uses equipment/ materials
- ☐ demonstrates concern for safe procedures/techniques
- ☐ measures accurately and efficiently
- ☐ practises proper sanitation procedures
- ☐ minimizes waste of materials
- ☐ anticipates potential hazards and emergency response

Investigative Techniques
- ☐ identifies two or more local soil types using soil triangle and hand texturing techniques
- ☐ makes predictions that can be tested regarding the effects of:
  - soil pH on the growth of trees
  - temperature on the growth of trees
  - water quantity on the growth of trees
- ☐ plans and conducts field investigations to test each predictions
- ☐ uses relevant information to explain observations regarding the effects of soil pH, temperature and water quantity on the growth of trees
- ☐ ____________________
  ____
- ☐ analyzes relationships among manipulated/responding variables
- ☐ obtains accurate results that confirm/reject each prediction and answer related questions
- ☐ summarizes, applies and evaluates observations and experimental outcomes
- ☐ ____________________
  ____

REFLECTIONS/COMMENTS:

GUIDE TO INFERENCES: Forest Ecosystems FOR3090–3

INFERENCE

Definition: to derive a conclusion from facts or premises

Synonyms: infer, deduce, deduct, draw, gather , judge

Criteria for Assessing Inferences

Inferences made in advanced level modules should:

- communicate the process used to derive conclusions
- be reliable and valid in light of information gathered.

Inferences must be communicated in a logical sequence with sufficient supporting detail. Both the type and amount of information used to derive a conclusion are important in determining the reliability/validity of the inference.

Each inference made regarding interrelationships in forest ecosystems should provide:

- a clear statement of the factors being investigated
- relevant facts and detail that support more than one point of view; *e.g., cultural, ethical, economic, environmental, health-related, scientific, political*
- a logical sequence of ideas that lead to a conclusion
- evidence that different points of view were considered in deriving the conclusion
- a valid and realistic conclusion that is based on analysis and synthesis of information.

Causal Relationships and Inferences

The student makes two or more inferences regarding each of the following:

☐ the effects of local forests on soil; e.g.:
  - nutrient content
  - hydrologic cycle
  - pH balance

☐ the effects of local forests on water; e.g.:
  - surface water
  - ground water

☐ the effects of local forests on weather

☐ the effects of local forests on biotic factors; e.g.:
  - plants
  - animals

☐ the effects of global forests on climate

☐ structural adaptations of living organisms to changes in a forest environment; e.g.:
  - adaptation to site conditions
  - reproductive adaptation

☐ behavioural adaptations of living organisms to changes in a forest environment

☐ ______________________________

☐ ______________________________

RATING SCALE

4	3	2	1	0
Exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence.	Meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively.	Meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately.	Meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately.	Has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

RESEARCH PROCESS: Forest Associations FOR3090–4

TASK	OBSERVATION/RATING					
Preparation and Planning	4	3	2	1	0	N/A
Information Gathering and Processing	4	3	2	1	0	N/A
Content	4	3	2	1	0	N/A
Collaboration and Teamwork	4	3	2	1	0	N/A
Information Sharing	4	3	2	1	0	N/A

STANDARD IS 3 IN EACH APPLICABLE TASK

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence.

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively.

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately.

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately.

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

N/A Not Applicable

TASK CHECKLIST

The student:

Preparation and Planning

- ☐ sets clear goals and establishes steps to achieve them
- ☐ creates and adheres to detailed timelines
- ☐ uses personal initiative to formulate questions and find answers
- ☐ plans and uses time effectively, prioritizing tasks on a consistent basis

Information Gathering and Processing

- ☐ accesses a range of relevant information sources and recognizes when additional information is required
- ☐ demonstrates resourcefulness in collecting data
- ☐ interprets, organizes and combines information in creative and thoughtful ways
- ☐ records information accurately with appropriate supporting detail and using correct technical terms
- ☐ recognizes underlying bias/assumptions/values in information sources
- ☐ assesses and refines approach to the task and project status based on feedback and reflection

Content

- ☐ explains how each tree species has unique site and climatic requirements that determine its ability to grow in particular environments
- ☐ provides descriptive accounts of the silvics of five common Alberta tree species; e.g.:
  - tree form
  - growth patterns and life cycle
  - soil requirements

Content (continued)

  - climatic and moisture requirements
  - aspect and elevation
- ☐ provides descriptive accounts of the structural characteristics and environments of three common Alberta forest associations, and factors that have determined their existence; e.g.:
  - location on a map
  - soil type
  - position of slope
  - overstorey and dominant understorey
- ☐ ____

  ____

Collaboration and Teamwork

- ☐ cooperates with group members
- ☐ shares work appropriately among group members
- ☐ negotiates with sensitivity solutions to problems
- ☐ displays effective communication and leadership skills

Information Sharing

- ☐ demonstrates effective use of a variety of communication media: e.g., *written, oral, audio-visual*
- ☐ communicates thoughts/feelings/ideas clearly to justify or challenge a position
- ☐ maintains acceptable grammatical and technical standards
- ☐ gives evidence of adequate information gathering by citing seven or more relevant information sources

REFLECTIONS/COMMENTS:

COMMON FOREST ASSOCIATIONS IN ALBERTA

FOR3090–5

Natural Subregion	Forest Association	Structure	Soil Texture	Soil Moisture	Slope Position
Montane	Lodgepole Pine/ Bearberry	Tree/Shrub	silty loamy	Very dry	Upper
	White Spruce/ Horsetail	Tree/Forb	peaty	Wet	Toe
	Aw-Sw-Pl/Hairy Wild Rye	Tree/Grass	fine loamy to clayey	Moist	Upper
Lower Foothills	Lodgepole Pine/ Lichen	Tree/Lichen	sandy	Very dry	Upper
	Pl-Sb/Labrador Tea	Tree/Shrub	loamy or clayey	Moist	Middle
	Sb-Pl/Labrador Tea	Tree/Shrub	silt loam to silty clay loam	Wet	Lower
	Treed Bog	Tree/Shrub	organic	Wet	Depression
	Sb-Sw/Labrador Tea/ Horsetail	Tree/Shrub/ Forb	organic	Wet	Toe
	Aw-Sw-Pl/Low Bush Cranberry	Tree/Shrub	fine loamy clayey	Moist	Middle
	Treed Poor Fen	Tree/Shrub	organic	Wet	Depression
	Aw-Sw-Pl/Bracted Honeysuckle	Tree/Shrub	fine loamy - clayey	Moist	Lower
	Aw-Sw-Pl/Hairy Wild Rye	Tree/Grass	Fine loamy	Dry	Upper
Upper Foothills	Lodgepole Pine/ Lichen	Tree/Lichen	fine loamy clayey	Very dry	Upper
	Pl-Sb/Labrador Tea	Tree/Shrub	fine loamy clayey	Moist	Middle
	Sb-Pl/Labrador Tea	Tree/Shrub	silt loam to clay loam	Wet	Lower
	Treed Bog	Tree/Shrub	organic/loam	Wet	Depression
	White Spruce/ Horsetail	Tree/Forb	silty loam - clay loam	Wet	Lower
	Pl/Tall Bilberry	Tree/Shrub	fine loamy - clayey	Moist	Upper
	Pl/Hairy Wild Rye	Tree/Grass	fine loamy	Dry	Upper
	Pl/Bracted Honeysuckle	Tree/Shrub	silt loam to clay foam	Wet	Toe

Natural Subregion	Forest Association	Structure	Soil Texture	Soil Moisture	Slope Position
Boreal Mixed Wood	Jack Pine/Lichen	Tree/Lichen	sandy, loamy sandy	Very dry	Upper
	Pj-Sb/Labrador Tea	Tree/Shrub	clayey to loamy	Moist	Middle
	Sb-Pj/Labrador Tea	Tree/Shrub	variable	Moist	Lower
	Treed Bog	Tree/Shrub	organic	Wet	Toe
	Sb/Labrador Tea/ Horsetail	Tree/Shrub	variable	Wet	Toe
	Pj-Aw/Blueberry	Tree/Shrub	sandy-loamy sand	Dry	Upper
	Aw-Sw/Low Bush Cranberry	Tree/Shrub	loamy to clayey	Moist	Middle
	Pb-Aw/Dogwood	Tree/Shrub	loamy to clayey	Moist	Lower
	Sw/Horsetail	Tree/Forb	peaty	Moist	Toe
Foothills Parkland	Aw/Saskatoon/ Sarsaparilla	Tree/Shrub/ Forb	loamy or clayey	Dry to moist	Middle to upper
Central Parkland	Aw/Saskatoon/ Sarsaparilla	Tree/Shrub/ Forb	loamy or clayey	Dry to moist	Middle to Upper
	Aw-Pb/High Bush Cranberry	Tree/Shrub	loamy or clayey	Moist	Depressions
	Pb/Dogwood/ Horsetail	Tree/Shrub/ Forb	loamy or clayey	Moist	Flats and Depressions
Peace River Parkland	Pb/Dogwood/ Horsetail	Tree/Shrub/ Forb	loamy or clayey	Moist	Flats and Depressions

Tree Species Abbreviations:

- Aw – Trembling Aspen
- Pb – Balsam Poplar
- Pl – Lodgepole Pine
- Pj – Jack Pine
- Sb – Black Spruce
- Sw – White Spruce

Definitions

Forb:
any non-woody plant species other than grass or a grass-like plant.

Grass:
any member of the grass family.

Shrub:
any woody species with relatively low growth habit; often has several basal shoots

Tree:
a woody species with a single bole that is normally taller than a shrub.

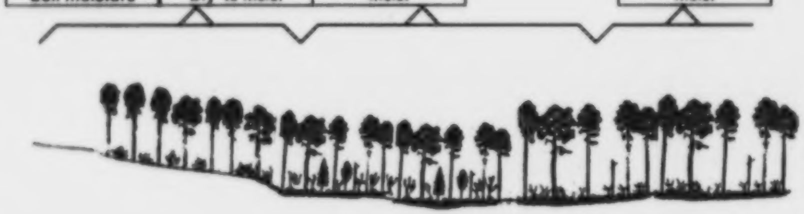
BEST COPY AVAILABLE

COMMON FOREST ASSOCIATIONS IN ALBERTA (continued) FOR3090–5

COMMON FOREST ASSOCIATIONS IN THE CENTRAL PARKLAND SUBREGION

Schematic A

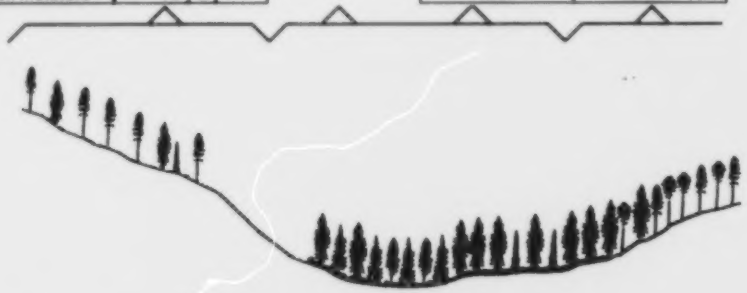
Forest Association	Aw/Saskatoon/ Sarasparilla	Aw-Pb/High Bush Cranberry	Pb/Dogwood/ Horsetail
Soil Texture	Loamy or clayey	Loamy or clayey	Loamy or clayey
Soil moisture	Dry to Moist	Moist	Moist



COMMON FOREST ASSOCIATIONS IN THE MONTANE SUBREGION

Schematic B

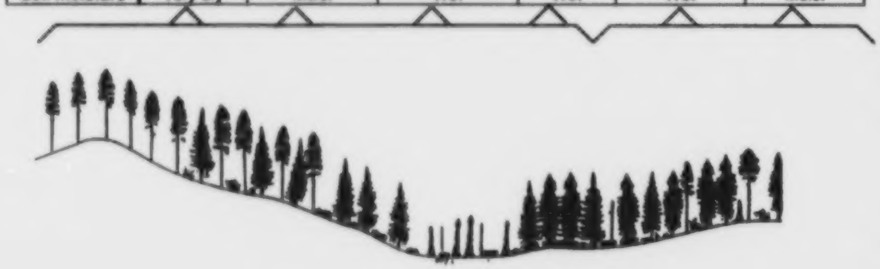
Forest Association	Pl/Bearberry	Sw/Horsetail	Aw-Sw-Pl/Hairy Wild Rye
Soil Texture	Silty loamy	Peaty	Fine loamy to clayey
Soil moisture	Very dry	Wet	Moist



COMMON FOREST ASSOCIATIONS IN THE LOWER FOOTHILLS SUBREGION

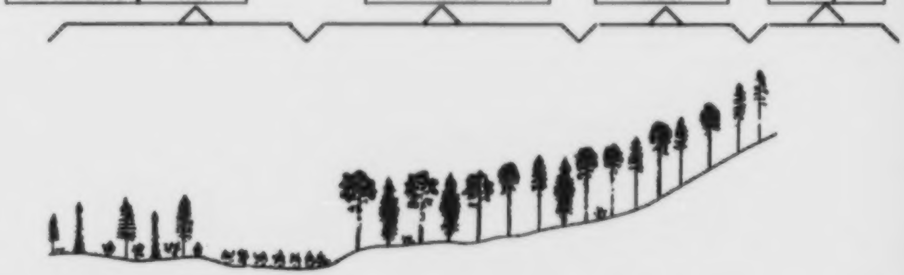
Schematic A

Forest Association	Pl/Lichen	Pl-Sb/ Labrador Tea	Sb-Pl Labrador Tea	Treed Bog	Sb-Sw/ Labrador Tea /Horsetail	Aw-Sw-Pl/ Low Bush Cranberry
Soil Texture	Sandy	Loamy or clayey	Silt loam to silty clay loam	Organic	Organic	fine Loamy clayey
Soil moisture	Very dry	Moist	Wet	Wet	Wet	Moist



Schematic B

Forest Association	Treed poor fen	Aw-Sw-Pl Bracted Honeysuckle	Aw-Sw-Pl/ Low Bush Cranberry	Aw-Sw-Pl/ Hairy Wild Rye
Soil Texture	Organic	Fine Loamy Clayey	Fine loamy clayey	Fine loamy
Soil moisture	Wet	Moist	Moist	Dry



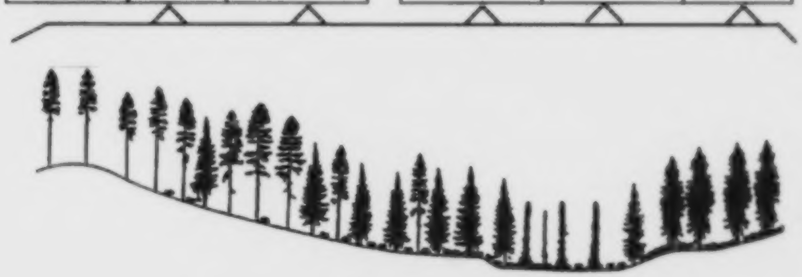
BEST COPY AVAILABLE

COMMON FOREST ASSOCIATIONS IN ALBERTA (continued) FOR3090–5

COMMON FOREST ASSOCIATIONS IN THE UPPER FOOTHILLS SUBREGION

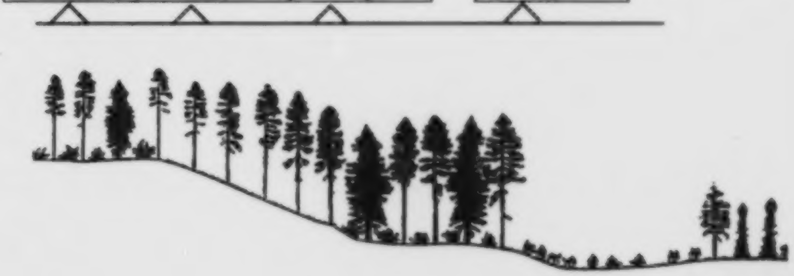
Schematic A

Forest Association	Pl/ Lichen	Pl-Sb/ Labrador Tea	Sb-Pl Labrador Tea	Tree Bog	Sw/ Horsetail
Soil Texture	Sandy	Loamy or clayey	Silt loam to silty clay loam	Organic	Peaty
Soil moisture	Very dry	Moist	Wet	Wet	Moist



Schematic B

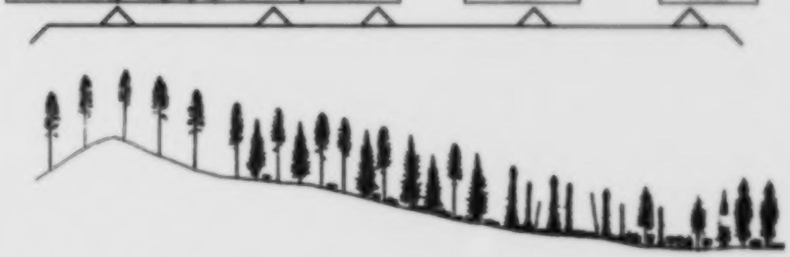
Forest Association	Pl/Tall Bilberry	Pl/Hairy Wild Rye	Pl/Bracted Honeysuckle
Soil Texture	Fine loamy - clayey	Fine loamy	Silt loam to clay loam
Soil moisture	Moist	Dry	Wet



COMMON FOREST ASSOCIATIONS IN THE BOREAL MIXEDWOOD SUBREGION

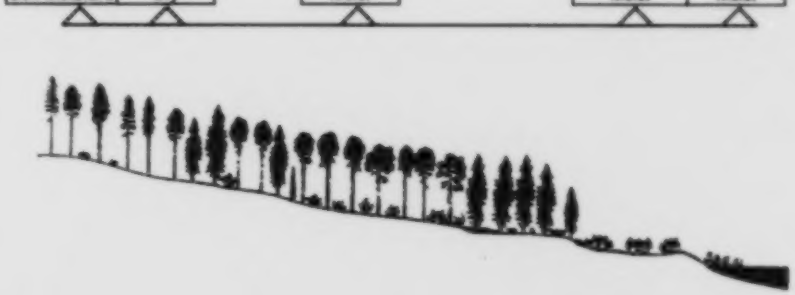
Schematic A

Forest Association	Pj/Lichen	Pj-Sb/ Labrador Tea	Sb-Pj/ Labrador Tea	Treed Bog	Sb/Labrador Tea/ Horsetail
Soil Texture	Sandy to loamy sand	Clayey to loamy	Variable	Organic	Variable
Soil Moisture	Very dry	Moist	Moist	Wet	Moist



Schematic B

Forest Association	Pj-Aw/ Blueberry	Aw-Sw/Low Bush Cranberry	Pb - Aw/ Dogwood	Sw/ Horsetail
Soil Texture	Sandy - loamy sand	Loamy to clayey	Loamy to clayey	Peaty
Soil Moisture	Dry	Moist	Moist	Moist



344

345

IDENTIFICATION GUIDE: Agents of Change FOR3090–6

Introduction

The identification guide includes only the most common insects and diseases that affect the forests of Alberta. It comprises the following identification keys:

Key 1:	General	Key 5:	Animal Damage
Key 2:	General	Key 6:	Disease
Key 3:	Abiotic Injury	Key 7:	Disease
Key 4:	Abiotic Injury	Key 8:	Insect Damage.

Each key is not intended to be exhaustive in pests and pest damages it can be used to identify. The key serves only as a beginner's guide to the identification of some common agents of forest change in Alberta.

Each identification key is based on information provided from the following source:

> Finck, Kelly E., P. Humphreys and G. Hawkins. 1989. *Field Guide to Pests of Managed Forests in British Columbia.* Forestry Canada and B.C. Ministry of Forests, Victoria, B.C. Joint Publ. No. 16. 188p.

Glossary of Terms

Chlorotic:	yellowish foliage owing to lack of chlorophyll
Frass:	solid excrement and chewed debris from insects, especially larvae
Galleries:	wandering tunnels or cavities under bark or in wood, associated with bark beetles or wood borers
Pitch tube:	a lump of pitch accumulating on the outside of the bark of a conifer resulting from pitch flow caused by bark beetle attack
Resinosus:	an abnormal flow of pitch from a conifer usually in response to infection, insect activity or wounding

Using the Keys

There are various factors/agents that cause damage in forest stands and in wood products. These can be grouped into the following categories:

- disease
- abiotic injuries—primarily owing to climatic and soil factors
- animal damage
- insect damage.

When identifying the cause of damage in a forest stand we usually focus attention on the symptoms because they are visible. The first step is to use General Keys to determine which of the above agents of change are responsible.

Notice that each of the keys provides two choices, e.g.:

a. whole tree affected
b. part of the tree affects.

Read both choices before selecting the appropriate one.

The General Keys will direct you to one of the above agents of change (disease, abiotic injury, animal damage or insect damage). Some of the keys will identify a large group of pests (e.g., trunk rots or root rots). Since there are many species of these pests, they are significant in the changes they cause in a stand of trees. The key on animal damage is based on symptoms. Specific animals causing the damage are not identified as the key is intended to establish the type of damage observed. The insects and diseases included in these keys are representative of the most common organisms found in the forests of Alberta.

You will use the identification guide to identify:

- 4 living agents of change
- 4 nonliving agents of change.

KEY 1 – GENERAL 1

- **a. Whole tree affected**
  - b. Crown entirely or partially discoloured, bright yellow, brown or red or lacking foliage; trees may be broken, laying on ground or erect and lower stem buried in sediment; crown, if present, may not be deformed
    - c. Widespread area affected, especially in low lying areas or in bands along slopes, near industrial sites, adjacent to streams or on lower slops in mountainous terrain; trees in small clumps are uniformly affected
      Key 4 Abiotic Injuries 2
    - c. Trees affected randomly and to a varying extent
      - d. Resinosis present on stem or at root collar
        - e. Resinosis at root collar
          - f. Resinosis, mycelia, fruiting bodies around root collar
            Key 6 Disease 1
          - f. Resinosis, galleries, frass around root collar, roots chewed
            Key 8 Insect Damage
        - e. Resinosis, swelling, cankers or fruiting bodies on main stem or branches
          Key 6 Disease 1
      - d. Bark removal from stems or roots
        Key 5 Animal Damage
  - b. Crown thin, chlorotic, poor growth, crown not generally deformed
    - g. Widespread area affected, impact on trees quite uniform, no evidence of disease, no industrial site nearby nor are trees on poor sites
      Key 3 Abiotic Injuries 1
    - g. Affected trees in patches or scattered individuals, standing dead and/or windthrown trees; trees affected to varying degrees
      Key 6 Disease 1
- **a. Part of tree affected**
  - h. Foliage, leaders and/or branch tips affected
    Key 2 General 2
  - h. Main stem and/or branches affected
    - a. Trees erect or windthrown in random manner, cankers, fruiting bodies, resinosis, brooms or swellings
      Key 6 Disease 1
    - i. No cankers, fruiting bodies, resinosis, brooms or swellings
      - j. Splintered breakage of main stem, tops and/or branches, windthrown trees lying all in the same direction
        Key 3 Abiotic Injuries 1
      - j. Pitch, frass or cottony tufts present, branch or main stem gouting and /or breakage which may or may not be present
        Key 8 Insect Damage

KEY 2 – GENERAL 2

- **a. Foliage affected**
  - a. Trees affected in widespread area, especially in low lying areas or in bands along slopes
    Key 3 Abiotic Injuries 1
  - b. Trees affected in large to small areas, generally to varying extent
    - c. Needles uniformly coloured or mottled small fruiting bodies or blisters present, main stems or branches may not be affected
      Key 6 Disease 1
    - c. Extensive defoliation or needles uniformly discoloured or mottled, generally from top of crown downward and from the tips inward, chewed or clipped needles, mined buds, exit holes, webbing, frass and/or insects present
      Key 8 Insect Damage
- **a. Leaders and/or branch tips affected**
  - d. Bark removed or tips clipped off
    Key 5 Animal Damage
  - d. Bark not stripped, tips and/or buds not clipped
    - e. Tips may or may not curl, buds or needles mined, exit holes, frass, webbing or cottony tufts present
      Key 8 Insect Damage
    - e. Tips discoloured
      - f. Small dark fruiting bodies or white to orange blisters or cankers on bark
        Key 6 Disease 1
      - f. Buds mushy, in low lying areas or industrial site nearby
        Key 3 Abiotic Injuries 1

KEY 3 – ABIOTIC INJURIES 1

(Injuries to Crown/Foliage or Tips)

- **a. Tree leaning, windthrown or laying on ground**
  Key 4 Abiotic Injuries 2
- **a. Tree erect**
  - a. Damage to main stem and/or branches
    Key 4 Abiotic Injuries 2
  - b. Damage to crown
    Foliage discoloured or leaders and branch tips damaged
    - c. Tips of leaders, branches or branchlets affected (including buds). Damage most intense in depressions. Buds, new shoots, and needles brown in spring. Shoots and needles brown in the fall. Mushy buds, all species in a stand may be affected.
      Frost Damage
    - c. Foliage discolouration not restricted to the leader, branch or branchlet tips. No evidence of insects, animals or disease. No industrial site nearby, generally no noticeable discolouration/necrosis or deciduous and/or shrub layer. Crown is deep red-brown to brown
      - d. Damage in an elevational band along a slope
        Red Belt Injury
      - d. Damage does not extend in a band along a slope; needles, if any, lacking flecking
        - e. Crown is brown from top down and from new to old needles; needles may drop especially in late summer
          Drought Damage
        - e. Crown devoid of foliage or entire crown reddish brown, scorched appearance, evidence or burned bark.
          Fire Damage

KEY 4 – ABIOTIC INJURIES 2

(Injuries to Main Stem/Branches or Whole Tree)

- **a. Tree leaning, windthrown or broken; young to mature trees**
  - b. Trees windthrown or broken
    - c. Trees blown over, crown intact, root "mats" present, trees lie in one direction, branches and stem of adjacent trees may be scarred or splintered)
      Wind Damage (Windthrow and/or Windsnap)
    - c. Evidence of numerous broken trees aligned at right angles to the slope on steep middle and lower slops; sharp demarcation between old and young trees, damaged area may be occupied by shrubs and forbs.
      Avalanche Damage
  - b. Young trees bent over or deformed, older trees with uneven and splintered breakage of tops and/or upper branches, cankers not evident
    Snow or Ice Damage
- a. Tree erect, damage to main stem and/or branches
  - d. Bark removal of main stem generally evident
    - e. Main stem severely debarked and deeply gouged, exposed wood splintered; evidence of logging or construction activities adjacent, may also be associated with adjacent windfall
      Mechanical Damage
    - e. Main stem may be debarked but no evidence of gouging, splintering on wood; evidence or burned branch ends and charcoal
      Fire Damage
  - d. Main stem not severely damaged
    - f. Branches and/or top not broken or splintered, cankers not evident
      Snow and Ice Damage
    - f. Branches and/or top not broken or splintered
      - g. Upper surface of branches have wounds or scars associated with green ragged crown, lesions may or may not be on main stem
        Hail Damage
      - g. Lesions on main stem, bark removed from lesion or lower stem buried
        - h. Elongated basal scars at ground level
          Fire Scar
        - h. Lower section of stem buried by sediment from adjacent stream. Level topography adjacent to a stream. Evidence of periodic deposition of overburden.
          Flooding Damage

KEY 5 – ANIMAL DAMAGE

- **a. Bark removed from roots, branches or stem**

  Debarking

- **a. Portions of stems, twigs or branches severed, cut or splintered**
  - b. A relatively clean cut on twig, branch or stem
    - c. Stems and/or branches severed, multiple tooth marks on wood, numerous chips on ground below damage

      Cutting

    - c. Single, smooth, oblique cut, lack of multiple tooth marks

      Clipping

  - b. Twigs or stem with a ragged, torn appearance

    Browsing

KEY 6 – DISEASE 1

Diseases of roots and those affecting more than one kind of tissue

- **a. Whole tree affected**
  No cankers; scattered pockets of trees with thin chlorotic crowns with poor growth or standing dead, wind toppled trees in criss-cross pattern, trees of all ages affected

  Root Rots

- **a. Part of tree affected**
  - b. Part of crown affected
    Crown red, dead top and/or branches, cankers on main stem and/or branches on pines only

    Key 7 Disease 2

  - b. Either foliage or stem and/or branches affected
    Main stem and/or branches affected
    - c. Mature to overmature stand with conks visible on the main stem or at the base of the tree

      Key 7 Disease 2

    - c. Young to mature stand, stem lacks conks but may have flattened areas or swellings; brooms may occur in the crown
      - d. no pronounced swelling, necrotic areas consist of flattened or depressed tissue
      - d. Spindle to oval-shaped swellings present and/or deformation, necrotic areas raised
        - e. No brooms or aerial shoots

          Key 7 Disease 2

        - e. Brooms present
          Minor needle discolouration, no blisters on needles, aerial shoots or basal cups on swollen areas of branches and brooms. Aerial shoots around in cross section, branch pattern whorled.

          Lodgepole Pine Dwarf Mistletoe

KEY 7 – DISEASE 2

Cankers, Rusts and Trunk Rots

a. Various types of fungal fruiting bodies (conks) visible on tree trunks or fruiting bodies on ground near base of tree

Trunk Rots

a. Absence of conks or fruiting bodies on stem or near base of tree

  a. No noticeable swelling on stem, necrotic areas consist of flattened or depressed tissue, dead bark may have sloughed off stem

    b. On Aspen, rough, flattened area, black cracked bark

Hypoxylon Canker

    c. On Lodgepole Pine, elongated sunken, perennial canker, usually on lower bole. Resinosis, branch flagging, blue-black stain in sapwood under the canker

Atropellis Canker

  b. Spindle to oval-shaped swellings present on pines, raised necrotic areas on main stem and/or branches. Noticeable blistering of bark, sometimes elongated scars. Fruiting structures are white, yellow or orange powdery blisters.

Pine Stem Rusts

KEY 8 INSECT DAMAGE

a. Entire crown affected

  b. Coniferous hosts. Needles chewed to varying degrees, needle stubs may or may not remain on the tree

Defoliators (Sawflies or Budworms)

  b. Deciduous hosts

Defoliators (Tent Caterpillars, Leaf-Eating Beetles, Leaf Miners)

a. Leaders and branches, stems or roots affected

  h. Main stems affected

    i Entire tree dying, crown yellow or reddish brown; boring dust around base of tree, tunnels on inside of bark

Bark Beetles

    i Tree may be alive or dead; may have presence of sap flow from insect entrance holes; insect feeding penetrates deeply into wood

Wood Borers or Carpenter Ants

  h. Roots or root collar area affected. Pitch tubes at root collar. Resin-soaked duff near root collar. Trees up to 3 m tall are most susceptible, entire crown may be reddish.

Warren's Root Collar Weevil

KNOWLEDGE/APPLICATION ASSESSMENT: Silviculture FOR3110–1

Assessment Criteria and Conditions:

- identifying and describing:
  - major components of silviculture, including stand establishment, stand management and harvest
  - the silvics of five Alberta tree species.

Suggested Reference(s):

- *Our Growing Resource*
- *Woodlot Management Guide for the Prairie Provinces*
- *Native Trees of Canada*

STANDARD: Respond to a standard of 3 on the rating scale.

Rating Scale

The student:

4 meets project/task objectives in a self-directed manner. Provides explanations and critical judgements based on a superior knowledge base. Demonstrates an understanding of relevant concepts and related issues.

3 meets project/task objectives in a self-directed manner. Provides explanations and comparisons of relevant concepts using more precise terminology. Requires little or no prompting.

2 meets project/task objectives with limited assistance in planning and in selecting and using resources. Applies knowledge of concepts in different situations using correct terminology. Requires occasional prompting.

1 completes task as directed, demonstrating basic skills/completeness by following a guided course of action. Uses simple recall to demonstrate basic knowledge of concepts. Requires prompting.

0 does not complete the task, or is unable to provide a suitable response.

N/A Not Applicable

Background Information

See *Our Growing Resource*, Chapter 2 – The Challenge of Sustainable Development:

- Managing Forest Development
- Integrated Resource Management – Accommodating Many Uses
- Harvest Planning and Practices
- Reforestation
- Air and Water Quality
- Building Sustainable Businesses.

See *Woodlot Management Guide for the Prairie Provinces*, Section IV– Woodlot Management:

- Management Planning
- Reforestation
- Stand Tending
- Harvest
- Fire Protection.

Sample Questions/Activities

1. **Provide a comprehensive definition of silviculture and its role in forestry.**
2. **Identify and explain major components of silvicultural systems, including:**
   - stand establishment
   - stand management
   - harvest and cutting methods.
3. **Explain how individual tree species have unique ecological requirements that determine suitable silvicultural practices.**
4. **Describe and compare the silvics of five or more Alberta tree species with respect to:**
   - growth characteristics
   - reproduction habitat requirements (e.g., soil, water, temperature).
5. **Describe one or more research programs designed to improve silvicultural practices;** e.g.:
   - biotechnology
   - application of information technology
   - cultural/operational applications.
6. **Develop a glossary of 20 or more terms relevant to silviculture.**

SAMPLE FORMAT: Silvics of a Tree Species	**FOR3110–2**

A. TREE NAME

1. Common: ______________________

2. Botanical: ______________________

B. GROWTH FORM

____

____

____

____

C. HABITAT REQUIREMENTS

1. Climate:

____

____

2. Soils and Topography:

____

____

3. Associated Trees and Shrubs:

____

____

DISTRIBUTION
(as outlined on a map of Canada)

D. LIFE HISTORY

1. Reproduction and Early Growth

(a) Flowering and Fruiting:

(b) Seedling Development:

(c) Vegetative Reproduction (if applicable):

2. Sapling to Maturity

(a) Growth and Yield:

(b) Reaction to Competition:

(c) Major Enemies:

GROWTH FORM

(as sketched or outlined)

LAB INVESTIGATIONS: Natural and Artificial Regeneration FOR3110–3

TASK	OBSERVATION/RATING					
Management	4	3	2	1	0	N/A
Teamwork	4	3	2	1	0	N/A
Equipment and Materials	4	3	2	1	0	N/A
Investigative Techniques	4	3	2	1	0	N/A

STANDARD IS 3 IN EACH APPLICABLE TASK

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence.

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively.

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately.

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately.

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

N/A Not Applicable

TASK CHECKLIST

The student:

Management
- ☐ prepares self for task
- ☐ organizes and works in an orderly manner
- ☐ interprets and carries out instructions accurately
- ☐ plans and uses time effectively in a logical sequence
- ☐ displays leadership in adhering to routine procedures
- ☐ attempts to solve problems prior to requesting help

Teamwork
- ☐ cooperates with group members
- ☐ shares work appropriately among group members
- ☐ negotiates with sensitivity solutions to problems
- ☐ displays effective communication skills

Equipment and Materials
- ☐ independently selects and uses equipment/ materials
- ☐ demonstrates concern for safe procedures/techniques
- ☐ measures accurately and efficiently
- ☐ practises proper sanitation procedures
- ☐ minimizes waste of materials
- ☐ anticipates potential hazards and emergency response

Investigative Techniques
- ☐ uses relevant information to explain observations regarding natural regeneration; e.g.:
  - seed supply
  - vegetative reproduction
- ☐ uses relevant information to explain observations regarding artificial regeneration; e.g.:
  - direct seeding
  - bare-root/container seedlings
- ☐ makes predictions that can be tested regarding one or more methods of regeneration
- ☐ plans, sets up and conducts experiments to test a prediction
- ☐ analyzes relationships among manipulated/responding variables
- ☐ obtains accurate results that confirm/reject prediction and answers related questions
- ☐ summarizes, applies and evaluates observations and experimental outcomes; e.g.:
  - for species with wind-disseminated seed, assesses height and/or age of seedlings as a function of distance from edge of cutblock
  - for species with slash borne cones, assesses whether adequate seed is available per unit area
  - for direct seeding, is sufficient seed being broadcast to insure block stocking?
  - for bare root/container planting, are sufficient seedlings being planted to insure a fully stocked stand?

REFLECTIONS/COMMENTS:

TREE IMPROVEMENT

1. Explain major objectives of a tree improvement program.
2. Identify factors to consider in choosing a natural seed production area.
3. Cite advantages and disadvantages of clonal and seedling seed orchards.
4. Describe methods of increasing seed production in a seed production area.

CONE COLLECTION

1. Identify major factors influencing seed production in conifers.
2. Large cone crops in pine occur if climatic conditions are favourable. What stages of flower and cone development are the most critical? What kind of climatic conditions favour each of these stages?
3. Identify reasons for conducting a cone crop survey.
4. Describe methods of collecting cones from natural forest stands.
5. Seed testing is carried out for a number of parameters. Identify and explain three of them.
6. Identify and explain one physical test conducted to determine the viability of seed.

SITE PREPARATION

1. Provide reasons for ensuring adequate site preparation.
2. Describe mechanical methods of site preparation.
3. Explain advantages of a brush rake over an angled dozer blade in scarification operations.
4. Identify two functions of a drag type scarifier.
5. Identify types of mechanical scarification equipment that are commonly used in addition to those listed above.

SEEDING

1. Identify factors that determine the timing of a successful direct seeding operation.
2. What is the recommended time of year for carrying out a conifer seeding operation in Alberta? Give reasons for conducting conifer seeding operations at this time.
3. Seeding operations in Alberta have at times failed. Identify factors that may influence the success rate of seeding operations.
4. Identify biological advantages of spot seeding over broadcast seeding.

CONTAINER PLANTING

1. Explain requirements of a successful container system.

2. Describe desirable physical characteristics of container seedlings.

3. Explain advantages of growing seedlings in containers rather than as bare root stock in a nursery.

4. One of the critical elements in survival of a tree seedling is to maintain a favourable water balance. What is meant by the water balance? How can a tree seedling maintain a favourable water balance?

INTERMEDIATE STAND TREATMENTS

1. Define and give examples of intermediate stand treatments.

2. What is the major objective of release cutting? Identify the predominant growth stage(s) for trees that are released.

3. Describe methods of undertaking a liberation cut in a stand. Identify advantages and disadvantages of each method.

PRUNING

1. Identify and explain three stages of natural pruning. Briefly describe factors that may affect each stage.

2. Identify and describe three objectives of artificial pruning.

3. Explain potential hazards that may result from the excessive pruning of spruce trees.

4. What minimum live crown ratio should be attained when pruning?

5. Cite reasons for pruning conifers in the late winter or early spring.

PRUNING (continued)

6. Why is it important when pruning large diameter limbs (i.e., over 4 cm in diameter) that the initial cut be made 10 to 15 cm away from the bole of the tree?

7. Explain why hand pruning saws have curved blades and teeth pointing back toward the handle.

8. Why is it important when pruning to make a clean cut that is flush with the bole?

FERTILIZATION

1. Explain the process of organic matter decomposition on the forest floor.

2. Identify and explain important principles of fertilizer application.

3. Explain ways in which wood quality in a forest stand is altered as a result of fertilizer application.

4. Why should fertilizer high in phosphorous be used at the time of planting?

5. One example of a mixed fertilizer is 10–52–10. Explain what these numbers mean? What purpose would this fertilizer be most suited to?

6. Suggest fertilizers appropriate to three different stages of forest growth.

   e.g., seedling establishment
   after crown closure
   10 to 15 years before harvest

TASK CHECKLIST: Stand Establishment and Tending FOR3110–5

SITE PREPARATION

The student:

☐ lists six or more objectives of site preparation

☐ explains techniques and applications of mechanical site preparation; e.g.:
  - ☐ scalping
  - ☐ trenching
  - ☐ plowing mixing
  - ☐ mounding

☐ identifies and describes common types of equipment used in mechanical site preparation; e.g.:
  - ☐ blade
  - ☐ plow
  - ☐ drag scarifier
  - ☐ disc trencher
  - ☐ spot scarifier
  - ☐ mounder/inverter

☐ demonstrates techniques and applications of manual and motor manual site preparation

☐ explains applications of fire and herbicides in site preparation

☐ identifies geographic areas not suited to site preparation and explains why

☐ assesses three or more site preparation methods relative to site location

CONE COLLECTION AND SEED EXTRACTION

The student:

☐ identifies and describes common methods of cone collection; e.g.:
  - ☐ squirrel caches
  - ☐ felling and picking
  - ☐ aerial collection

☐ identifies appropriate equipment and safe techniques for one or more methods of cone collection

☐ describes handling, tagging and temporary storage procedures for collected cones

☐ demonstrates seed extraction and seed cleaning techniques

☐ conducts one or more seed tests; e.g.:
  - ☐ purity
  - ☐ weight
  - ☐ germination
  - ☐ moisture content
  - ☐ viability

☐ describes methods of seed storage

☐

DIRECT SEEDING

The student:

☐ describes characteristics of a favourable seed bed; e.g.:
  - ☐ physical nature of the forest floor
  - ☐ kind and amount of vegetation

☐ describes techniques and applications of direct seeding; e.g.:
  - ☐ broadcast seeding
  - ☐ spot seeding

☐ identifies and describes common types of equipment used in direct seeding

☐ outlines steps that can be taken to enhance success with direct seeding; e.g.:
  - ☐ timing the seeding operation
  - ☐ preparing the seed bed
  - ☐ managing seed quality and quantity
  - ☐ controlling seed predators

☐

☐

PLANTING STOCK

The student:

☐ demonstrates correct techniques for the care and handling of bare root and container stock; e.g.:
- ☐ physical handling
- ☐ temperature control
- ☐ moisture/humidity control

☐ demonstrates three or more hand-planting methods; e.g.:
- ☐ L-slit method
- ☐ mattock method
- ☐ planting bar method
- ☐ wedge method

☐ identifies and describes common hand-planting tools and equipment; e.g.:
- ☐ planting spade
- ☐ dibble
- ☐ planting bar
- ☐ pottiputki
- ☐ mattock

☐ demonstrates correct planting technique; e.g.:
- ☐ cleans out planting spot before making hole
- ☐ keeps roots of planting stock moist at all times, taking plants out of planting bag one at a time
- ☐ makes hole large and deep enough to ensure proper placement of roots
- ☐ plants firmly in ground to correct depth and within 30% of vertical
- ☐ closes hole from bottom to top, packing soil firmly against roots to prevent air pockets
- ☐ performs final check by gently tugging on plant

SPACING AND THINNING

The student:

☐ identifies optimum spacing and stocking rates for one or more species of seedlings

☐ describes generally accepted rules of thumb for scheduling spacing and thinning treatments of crop trees

☐ describes applications of three or more thinning treatments; e.g.:
- ☐ juvenile spacing
- ☐ sanitation spacing
- ☐ conifer release
- ☐ commercial thinning

☐ establishes criteria for identifying trees to keep and trees to cut in a forest stand

☐ inspects crop trees for damage, e.g.:
- ☐ broken stems
- ☐ saw nicks
- ☐ broken leaders
- ☐ stripped limbs

☐ selects dominant and codominant trees to be saved as crop trees in a forest stand

☐ describes two or more thinning treatments; e.g.:
- ☐ cutting with brush saws/chain saws
- ☐ girdling
- ☐ hand pulling
- ☐ use of herbicides

☐

PRUNING AND SANITATION

The student:

☐ identifies reasons for artificial pruning

☐ describes factors that determine the timing of pruning operations

☐ identifies criteria for selecting crop trees to be pruned; e.g.:
- ☐ species characteristics
- ☐ growth rate
- ☐ number, size and age of trees

☐ demonstrates correct pruning technique; e.g.:
- ☐ live crown ratio greater than 40%
- ☐ proper pruning height
- ☐ branch cuts flush with bole

☐ identifies and describes common pruning tools and equipment; e.g.:
- ☐ hand and pole saws
- ☐ axes, brushhooks and hatchets
- ☐ chisels and pulling knives
- ☐ machines

☐ inspects residuals in a forest stand for:
- ☐ signs of damage
- ☐ quality of stems

☐ verifies that slash in a forest stand is bucked to lay flat on the ground

☐

☐

BEST COPY AVAILABLE

STANDARD IS 2 IN EACH APPLICABLE TASK

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence.

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively.

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately.

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately.

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

N/A Not Applicable

REFLECTIONS/COMMENTS

RESEARCH PROCESS: Forest Harvest Methods FOR3110–6

TASK	OBSERVATION/RATING					
Preparation and Planning	4	3	2	1	0	N/A
Information Gathering and Processing	4	3	2	1	0	N/A
Content	4	3	2	1	0	N/A
Collaboration and Teamwork	4	3	2	1	0	N/A
Information Sharing	4	3	2	1	0	N/A

STANDARD IS 3 IN EACH APPLICABLE TASK

Rating Scale

The student:

4 exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence.

3 meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively.

2 meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately.

1 meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately.

0 has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

N/A Not Applicable

TASK CHECKLIST

The student:

Preparation and Planning
- ☐ sets clear goals and establishes steps to achieve them
- ☐ creates and adheres to detailed timelines
- ☐ uses personal initiative to formulate questions and find answers
- ☐ plans and uses time effectively, prioritizing tasks on a consistent basis

Information Gathering and Processing
- ☐ accesses a range of relevant information sources and recognizes when additional information is required
- ☐ demonstrates resourcefulness in collecting data
- ☐ interprets, organizes and combines information in creative and thoughtful ways
- ☐ records information accurately with appropriate supporting detail and using correct technical terms
- ☐ recognizes underlying bias/assumptions/values in information sources
- ☐ assesses and refines approach to the task and project status based on feedback and reflection

Content
- ☐ explains factors relevant to choosing a suitable method of harvest:
  - silvics of tree species
  - intended utilization
  - impact on wildlife and watershed
  - impact on other stakeholder groups
- ☐ provides a descriptive account and explains advantages/disadvantages of the:
  - clearcutting system of harvest
  - seed tree system of harvest

Content (continued)
  - shelterwood system of harvest
  - selection system of harvest
- ☐ makes recommendations (based on silvics) regarding an appropriate harvest method for each of seven Alberta tree species
- ☐ identifies social, economic and environmental factors that may influence harvest methods
- ☐ explains modifications to harvest systems that accommodate local site conditions and management objectives; e.g.:
  - clearcutting with reserves
  - forest ecosystem networks
  - single-tree selection

Collaboration and Teamwork
- ☐ cooperates with group members
- ☐ shares work appropriately among group members
- ☐ negotiates with sensitivity solutions to problems
- ☐ displays effective communication and leadership skills

Information Sharing
- ☐ demonstrates effective use of a variety of communication media; e.g., *written, oral, audio-visual*
- ☐ communicates thoughts/feelings/ideas clearly to justify or challenge a position
- ☐ maintains acceptable grammatical and technical standards
- ☐ gives evidence of adequate information gathering by citing seven or more relevant information sources

REFLECTIONS/COMMENTS:

Assessment Criteria and Conditions:

- definitions and Alberta examples of sustainable development, sustained yield, integrated land use and multiple use management.

Suggested Reference(s):

- *Our Growing Resource*
- *Alberta's Focus on Forests*
- *Managing the Forest*

STANDARD: Respond to a standard of 3 on the rating scale.

Rating Scale

The student:

4 meets project/task objectives in a self-directed manner. Provides explanations and critical judgements based on a superior knowledge base. Demonstrates an understanding of relevant concepts and related issues.

3 meets project/task objectives in a self-directed manner. Provides explanations and comparisons of relevant concepts using more precise terminology. Requires little or no prompting.

2 meets project/task objectives with limited assistance in planning and in selecting and using resources. Applies knowledge of concepts in different situations using correct terminology. Requires occasional prompting.

1 completes task as directed, demonstrating basic skills/completeness by following a guided course of action. Uses simple recall to demonstrate basic knowledge of concepts. Requires prompting.

0 does not complete the task, or is unable to provide a suitable response.

N/A Not Applicable

Background Information

See *Our Growing Resource*, Chapter 2 – The Challenge of Sustainable Development:

- Managing Forest Development
- Integrated Resource Management – Accommodating Many Uses
- Harvest Planning and Practices
- Reforestation
- Air and Water Quality
- Building Sustainable Businesses.

See *Alberta's Focus on Forests*, Unit 5 – Forest Management for All:

- 5.1: Forest Values
- 5.2: Decision for Change
- 5.3: Forest Perspectives
- 5.4: Reforestation: Forests or Tree Farms?
- 5.5: Integrated Resource Management.

Sample Questions/Activities

1. **Explain the goals of "sustainable development" and "sustainable yield" within the context of Alberta's forests.**
2. **Interpret and discuss the meaning of the following definition of sustainable forest management:** *"the development of forests to meet current needs without prejudice to their future productivity, ecological diversity, or capacity for regeneration."*
3. **Identify and explain major components/considerations relevant to sustainable forest management;** e.g.:
   - – timber resources
   - – biodiversity of wildlife
   - – air, land and water quality.
4. **Explain why forests can and should serve many purposes.**
5. **Compare principles of integrated land use with principles of multiple use management by citing examples of each within Alberta.**
6. **Explain strategies for consultation and public involvement in forest management decisions in Alberta.**

ASSESSMENT CRITERIA: Developing a Forest Management Plan FOR3120–2

MANAGEMENT OUTCOMES

The student:

- ☐ identifies short- and long-term management goals for the area based on single use of the forest (e.g., recreation)
- ☐ justifies management goals as the preferred alternative for the area
- ☐ proposes a management plan for the area consistent with management goals that includes:
  - a statement of government policies and guidelines
  - a schedule of management activities
  - a process for public involvement
  - a strategy for monitoring use and resolving potential conflicts
- ☐ presents the management plan to class/peers in a logical sequence, supporting points with sound evidence
- ☐ identifies significant features of management plans presented by class/peers for the same area based on other types of forest use (e.g., wildlife habitat, wood fibre)
- ☐ negotiates with class/peers a set of compromised management goals and strategies for the area that support integrated land use (e.g., lumber, recreation, wildlife, gas, grazing) based on social, economic and environmental factors
- ☐ presents an integrated management plan for the forested area consistent with compromised management goals and strategies that attempts to address:
  - the views of relevant stakeholder groups
  - short- and long-term goals and objectives
  - proposed management standards and guidelines
  - a process for public involvement
  - a strategy for monitoring use and resolving potential conflicts.

PLANNING PROCESSES

Planning and Preparation

- ☐ sets goals and establishes steps to achieve them
- ☐ creates and adheres to useful timelines
- ☐ uses personal initiative to formulate questions and find answers
- ☐ plans and uses time effectively

Information Gathering and Processing

- ☐ accesses a variety of relevant information sources
- ☐ interprets, organizes and combines information in effective ways
- ☐ uses appropriate methods to calculate data and obtain accurate results

Collaboration and Teamwork

- ☐ cooperates with and shares work appropriately among team members
- ☐ shares information/opinions/suggestions, maintaining a balance between speaking and listening
- ☐ considers the ideas and suggestions of others, and when appropriate integrates new ideas into personal frame of reference

Negotiating and Debating

- ☐ explains positions adopted by presenting examples of possible consequences and implications
- ☐ presents a realistic plan in logical sequence supporting positions adopted
- ☐ provides a relevant and convincing rebuttal to opposing views
- ☐ negotiates solutions to problems and shared agreements by resolving divergent points of view

RATING SCALE

4	3	2	1	0
Exceeds defined outcomes. Plans and solves problems effectively and creatively in a self-directed manner. Tools, materials and/or processes are selected and used efficiently, effectively and with confidence.	Meets defined outcomes. Plans and solves problems in a self-directed manner. Tools, materials and/or processes are selected and used efficiently and effectively.	Meets defined outcomes. Plans and solves problems with limited assistance. Tools, materials and/or processes are selected and used appropriately.	Meets defined outcomes. Follows a guided plan of action. A limited range of tools, materials and/or processes are used appropriately.	Has not completed defined outcomes. Tools, materials and/or processes are used inappropriately.

STANDARD IS 2 IN MANAGEMENT OUTCOMES AND PLANNING PROCESSES

FORESTRY

SECTION H: LINKAGES/TRANSITIONS

This section of the Guide has been designed to provide an overview of linkages and transitions of CTS modules with a number of organizations. The charts and information presented in this section will assist CTS students and teachers in understanding the potential application of CTS modules as students move into the workplace.

TABLE OF CONTENTS

LINKAGES

With Other CTS Strands H.3
With Other Secondary Programs H.4

TRANSITIONS

To the Workplace H.4
To Related Post-secondary Programs H.4

CREDENTIALLING H.5

Charts

Forestry: Connections with Other CTS Strands H.6
Forestry in Junior High H.7
Forestry in Senior High H.8
Forestry: Connections Across the Curriculum H.9
Forestry: Correlations with Environmental and Outdoor Education 7, 8 and 9 .... H.10

Forestry: Related Occupations H.11
Forestry: Summary of Related Post-secondary Programs H.12

Credentialling Opportunities in Forestry H.13

LINKAGES/TRANSITIONS

LINKAGES

With Other CTS Strands

The Forestry strand provides opportunities for students to develop competencies in one or more forestry-related areas, including:

- personal and/or recreational use
- silviculture
- forest inventory
- forest harvest
- forest products
- forest management.

Each area of forestry links with competencies that are developed in other CTS strands. To facilitate and strengthen these linkages, courses may be designed by combining Forestry modules with modules from other CTS strands (e.g., Agriculture, Community Health, Energy and Mines, Legal Studies, Management and Marketing, Mechanics, Tourism Studies, Wildlife).

Linkages of particular relevance to the design of CTS courses in Forestry include:

Strand	Themes and/or Modules
Career Transitions	**Project modules** provide opportunities for learning beyond the expectations of given Forestry modules. **Practicum modules** enable students to work toward obtaining credentials in recognized in the workplace/community. **Safety modules** provide opportunities to address safety skills relevant to specific sectors of the forest industry. **Leadership modules** have application in a range of group activities conducted in wilderness/forest environments.
Community Health	Modules within the "Injury Prevention" theme link with a range of workplace competencies developed within the Forestry strand.
Legal Studies	Modules within the "Societal Contexts" theme (e.g., Environmental Law, Dispute Resolution, Landmark Decisions) can be contextualized within a forest industry.
Mechanics	Modules within the "Propulsion Systems" and "Guidance and Control Systems" themes can be contextualized within specific forest industry operations (e.g., maintenance of power driven machines).
Tourism Studies	Modules within the "Attractions" theme can be contextualized within a specific forest environment (e.g., outdoor adventure, ecotourism).
Wildlife	Modules within the "Management and Conservation" theme complement the study of forest ecology and forest management practices.

It is important to note that the project, practicum and safety modules in Career Transitions may be combined with Forestry modules to provide opportunities for students to:

- acquire safety competencies and credentials
- develop specific workplace skills
- expand upon a topic in a module or theme
- complete an investigation, project or service.

Additional information regarding connections with other CTS strands is provided in this section (see "Connections with Other CTS Strands").

Sample courses in Forestry that include modules from other CTS strands are also provided in this section (see "Forestry in Junior High" and "Forestry in Senior High").

With Other Secondary Programs

The Forestry strand has many links with other core and complementary subject areas across the curriculum. For example, many of the modules in Forestry link with the junior and senior high science programs, and provide opportunities for students to extend and apply related knowledge and skills in practical ways. Modules in the Forestry strand also link with topics developed in the complementary junior high Environmental and Outdoor Education program.

Core and complementary course linkages of particular relevance to CTS courses in Forestry include:

Course/ Program Area	Linkage/Connection
Language Arts	Application of the research process; development of reporting and oral/ multimedia presentation skills within a range of industry contexts.
Mathematics	Application of number operations, variables and equations, measurement (i.e., length, area, volume), statistics and probability within the context of forest inventory and sampling practices.
Science	Use of observation and experimentation; knowledge and theory of relevant topics in biology, ecology and earth science; analysis of relationships among science, technology, society and the environment.
Social Studies	Knowledge of the impact of social, economic and environmental perspectives on forests; issue analysis, negotiation, debate and environmental citizenship within a range of industry contexts.
Physical Education	Application of personal fitness and outdoor survival skills to excursions in a forest environment.
Fine Arts	Knowledge and awareness of the significance of forests and outdoor environments in art, music and drama.
Environmental and Outdoor Education	Application of outdoor and personal/group skills to activities conducted in forest environments; application of environmental knowledge/skills to forest ecology, silviculture practices and resource management.
CALM	Awareness of career opportunities and trends; career research and preparation.

Additional information regarding connections between Forestry modules and other core and complementary subject areas is provided in this section (see "Forestry: Connections Across the Curriculum").

A detailed correlation of the Forestry strand to the Environmental and Outdoor Education program is also provided in this section (see "Forestry: Correlations with Environmental and Outdoor Education 7, 8 and 9").

TRANSITIONS

To the Workplace

Intermediate and advanced modules are designed to develop knowledge, skills and attitudes that provide transitions to occupations in forestry-related areas. Some career sectors welcome individuals who have basic skills and are prepared to learn through further training from the employer.

The National Occupational Classification (NOC) chart in this section indicates occupations for which the Forestry strand provides a foundation (see "Forestry: Related Occupations").

To Related Post-secondary Programs

Advanced level modules will assist students to make plans regarding further studies in forestry at post-secondary levels. The Forestry modules provide desirable background and skills for entry into related programs at public and private colleges, technical institutes, universities and vocational colleges in Alberta.

A summary of related programs currently offered at post-secondary institutions in Alberta is provided in this section (see "Forestry: Summary of Related Post-Secondary Programs").

A number of articulation agreements have been established with post-secondary institutions in Alberta. These agreements provide preferred entrance and/or advanced standing/credit for CTS students who have successfully completed designated modules. A current summary of articulation agreements in place that involve CTS modules is available through Alberta Education's web site at <http://ednet.edc.gov.ab.ca>. For further information regarding particular articulation agreements, contact the post-secondary institution and/or review its respective calendar.

CREDENTIALLING

Students may earn partial or complete credentials recognized in the workplace and/or post-secondary institutions by demonstrating specified competencies within the CTS curriculum. The Forestry strand, in conjunction with modules from the Career Transitions strand, provides opportunities for students to develop competencies that link with a number of credentialling programs.

Of particular significance are credentials available through:

- First Aid certificate courses
- Alberta Safety Council programs
- Alberta Tourism Education Council (ATEC) programs.

Teachers may wish to explore opportunities for linking courses in Forestry with these and/or other credentialling programs. A partial list of credentialling opportunities relevant to CTS courses in Forestry is provided in this section (see "Credentialling Opportunities in Forestry").

Further information regarding these and other credentialling opportunities available to CTS students is provided in the *Career & Technology Studies Manual for Administrators, Counsellors and Teachers* (see Appendix 14: Credentialling Opportunities in CTS), and also through Alberta Education's web site at <http://ednet.edc.gov.ab.ca>.

LINKAGES – *Forestry: Connections with Other CTS Strands*

Other CTS Strands

Forestry Modules	Agriculture	Career Transitions	Communication Technology	Community Health	Construction Technologies	Cosmetology Studies	Design Studies	Energy and Mines	Electro-Technologies	Enterprise and Innovation	Fashion Studies	Financial Management	Foods	Fabrication Studies	Information Processing	Legal Studies	Logistics	Management and Marketing	Mechanics	Tourism Studies	Wildlife
Theme: Social and Cultural Perspectives																					
FOR1010: Why Forestry?		▤													▤					▤	■
FOR1020: Forest Regions of Canada		▤	▤																	■	■
FOR1040: Woods Survival 1		▤		■																■	■
FOR2010: Making a Difference		▤	▤												▤					▤	■
FOR2030: Managing Alberta Forests		▤													▤	▤					
FOR2040: Woods Survival 2		▤		■												▤				■	■
FOR3010: Issues in Forestry		▤	▤					▤							▤					▤	■
Theme: Technology and Applications																					
FOR1050: Mapping & Aerial Photos		▤		▤				▤												▤	▤
FOR1060: Measuring the Forest 1		▤		▤																	▤
FOR2060: Measuring the Forest 2		▤		▤																	▤
FOR2070: Harvest Practices		▤			▤				▤							▤		▤	■		▤
FOR3060: Measuring the Forest 3		▤																			▤
FOR3070: The Forest Marketplace		▤			▤										▤			▤			
FOR3080: Forest Technology Applications		▤						▤	▤						▤						
Theme: Management and Conservation																					
FOR1090: Forest Ecology 1	▤	▤						▤													▤
FOR1100: Forests Forever 1		▤													▤						▤
FOR2100: Forests Forever 2		▤													▤						▤
FOR2120: Users in the Forest	▤	▤						▤							▤	▤					▤
FOR3090: Forest Ecology 2	▤	▤						▤													▤
FOR3110: Silviculture	■	▤		▤															■		
FOR3120: Integrated Resource Management	▤	▤						▤							▤	▤					▤

Provides many direct links with competencies in this strand. Students will reinforce, extend and apply a substantial number of knowledge and/or skill components in practical situations.	■
Provides some links with competencies developed in this strand, usually through the application of related technologies and/or processes.	▤

BEST COPY AVAILABLE

LINKAGES – *Forestry in Junior High*

Course Emphasis	Forestry Modules	Mechanics Modules	Wildlife Modules	Tourism Studies Modules
Forest Ecology (3 modules)	Why Forestry? *FOR1010* Forest Ecology 1 *FOR1090*		Natural History of Wildlife *WLD1020*	
Forest Inventory (4 modules)	Why Forestry? *FOR1010* Mapping & Aerial Photos *FOR1050* Measuring the Forest 1 *FOR1060*		Measuring the Value *WLD2020*	
Logging and Timber Utilization (5 modules)	Why Forestry? *FOR1010* Forest Regions of Canada *FOR1020* Harvest Practices *FOR2070*	Engine Fundamentals *MEC1040* Mechanical Systems *MEC1130*		
Personal and Recreational Use (6 modules)	Why Forestry? *FOR1010* Mapping & Aerial Photos *FOR1050* Woods Survival 1 *FOR1040* Woods Survival 2 *FOR2040*		Angling & Fish Management *WLD1080*	The Attractions Sector *TOU1070*

LINKAGES – *Forestry in Senior High*

Course Emphasis	Forestry Modules	Wildlife Modules	Tourism Studies Modules	Career Transitions Modules
Personal and Recreational (3 credits) Prerequisite: Woods Survival 1	Making a Difference *FOR2010* Woods Survival 2 *FOR2040*		Adventure & Ecotourism *TOU3110*	
Silviculture (5 credits) Prerequisite: None	Forest Ecology 1 *FOR1090* Forest Ecology 2 *FOR3090* Silviculture *FOR3110* Forest Technology Applications *FOR3080*			Project 2A *CTR2110*
Harvest and Forest Products (5 credits) Prerequisite: Meauring the Forest 1 and 2	Managing Alberta Forests *FOR2030* Harvest Practices *FOR2070* The Forest Marketplace *FOR3070* Measuring the Forest 3 *FOR3060*			Project 2A *CTR2110*
Environmental Stewardship (3 credits) Prerequisite: None	Making a Difference *FOR2010*	Issues in Wildlife 1 *WLD2090*		Project 2A *CTR2110*
Forest Management (5 credits) Prerequisite: None	Issues in Forestry *FOR3010* Users in the Forest *FOR2120* Integrated Resource Management *FOR3120*	Interactions *WLD2060*		Project 2A *CTR2110*

LINKAGES – *Forestry: Connections Across the Curriculum*

Across the Curriculum

Forestry Modules	Junior High							Senior High											
	Language Arts	Social Studies	Mathematics	Science	Health & PLS	Physical Education	Fine Arts	English	Social Studies	Mathematics	Science (General)	Biology	Chemistry	Physics	CALM	Physical Education	Fine Arts	Social Sciences	Second Language
Theme: Social and Cultural Perspectives																			
FOR1010: Why Forestry?	▨	▨		▨				▨	▨		▨				▨		▨		
FOR1020: Forest Regions of Canada	▨	▨		■				▨	▨		▨	▨					▨		
FOR1040: Woods Survival 1						▨										▨			
FOR2010: Making a Difference	▨	▨		▨				▨	▨								▨		
FOR2030: Managing Alberta Forests	▨	▨						▨	▨										
FOR2040: Woods Survival 2						▨										▨			
FOR3010: Issues in Forestry	▨	▨		▨				▨	▨										
Theme: Technology and Applications																			
FOR1050: Mapping & Aerial Photos		▨	▨			▨										▨			
FOR1060: Measuring the Forest 1			▨	▨		▨						▨				▨			
FOR2060: Measuring the Forest 2			▨	▨		▨						▨				▨			
FOR2070: Harvesting Practices	▨			▨				▨				▨			▨				
FOR3060: Measuring the Forest 3				▨								▨							
FOR3070: The Forest Marketplace	▨	▨						▨	▨						▨				
FOR3080: Forest Technology Applications	▨			▨				▨											
Theme: Management and Conservation																			
FOR1090: Forest Ecology 1				■								■							
FOR1100: Forests Forever 1	▨			▨				▨			▨								
FOR2100: Forests Forever 2	▨			▨				▨			▨								
FOR2120: Users in the Forest	▨							▨											
FOR3090: Forest Ecology 2				■								■							
FOR3110: Silviculture				▨							▨	▨			▨				
FOR3120: Integrated Resource Management	▨							▨											

Provides many direct links with course content. Students will reinforce, extend and apply a substantial number of knowledge and/or skill components in practical contexts.	■
Provides some links with course content, usually through the application of related technologies and/or processes.	▨

BEST COPY AVAILABLE

LINKAGES – *Forestry: Connections with Environmental and Outdoor Education 7, 8 and 9*★

CTS Modules: Forestry

Themes/Topics: Environmental and Outdoor Education	Why Forestry? FOR 1010	Forest Regions of Canada FOR 1020	Woods Survival 1 FOR 1040	Mapping & Aerial Photos FOR 1050	Measuring the Forest 1 FOR 1060	Forest Ecology 1 FOR 1090	Forests Forever 1 FOR 1100	Making a Difference FOR 2010	Managing Alberta Forests FOR 2030	Woods Survival 2 FOR 2040	Measuring the Forest 2 FOR 2060	Harvest Practices FOR 2070	Forests Forever 2 FOR 2100	Users in the Forest FOR 2120	Issues in Forestry FOR 3010	Measuring the Forest 3 FOR 3060	The Forest Marketplace FOR 3070	Forest Technology Applications FOR 3080	Forest Ecology 2 FOR 3090	Silviculture FOR 3110	Integrated Resource Management FOR 3120
OUTDOOR CORE																					
Regard for self, others and the environment			x	x	x					x	x					x					
Trip preparation and safety			x							x											
Safe and comfortable outdoor living skills			x							x											
Applying information for safe route planning			x	x						x											
Environmentally responsible outdoor activities			x		x					x	x					x				x	
Physical fitness for outdoor activities																					
PERSONAL AND GROUP DEVELOPMENT																					
Respect and appreciation for self and others	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Setting realistic goals	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Personal communication skills	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Relationship of individuals to groups	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Group process skills	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
ENVIRONMENTAL CORE																					
Diversity of environments and life forms	x	x				x													x		
Interactions within environments	x	x				x													x	x	
Natural and human changes to the environment	x					x	x						x		x				x		
Air, water and soil cycles	x					x													x	x	
The sun as the primary energy source on Earth						x													x		
OUTDOOR EXPEDITIONS																					
Skill and judgement in outdoor expeditions			x	x	x					x	x					x				x	
Positive self-concept and regard for others			x							x											
Group problem solving and group living skills			x							x											
Regard for environments and responsible outdoor judgement			x	x	x					x	x					x				x	
ENVIRONMENTAL INVESTIGATIONS																					
Environmental investigation skills		x				x													x	x	
Strategies for responding to environmental concerns							x	x					x		x						x
COMMITMENT TO ACTION																					
Outdoor recreation as part of healthy lifestyle			x							x											
Appreciation of environments through respectful use	x		x				x	x		x			x		x						x
Responsible use of local and global environments	x		x				x	x		x			x		x						x
Plans to make personal growth a lifelong process								x							x						

★September 1997: All practical arts courses replaced by Career and Technology Studies.

TRANSITIONS – *Forestry: Related Occupations*

Information for this chart was obtained from the National Occupational Classification (NOC) descriptions.

Educational Requirements:

D:	High School Education	B:	College or Vocational Education
C:	Apprenticeship	A:	University

STRAND-RELATED OCCUPATIONS		EDUCATION REQUIREMENTS			
Occupation Profile	NOC#	D	C	B	A
Arborist	2225			✓	✓
Biochemist	2112				✓
Biologist and Related Scientist	2121				✓
Botanist	2121				✓
Chemist	2112				✓
Chainsaw and Skidder Operators	8421	✓			
Environmental Auditor	2263				✓
Environmental Education Specialist	4161				✓
Environmental Engineer	2131				✓
Forest Technologist	2223			✓	
Forester/Forestry Scientist	2122				✓
Forestry Professionals	2122				✓
Forestry Worker	8422			✓	
Hazardous Waste Management Technician	2263			✓	
Hydrologist	2113				✓
Inspectors in Public and Environmental Health and Occupational Health and Safety	2263			✓	✓
Interpretive Naturalist	2121			✓	✓
Labourers in Wood, Pulp and Paper Processing	9614	✓			
Land Surveyor	2154				✓
Land Use/Community Planner (Urban, Regional, Park)	2153				✓
Logging and Forestry Labourers	8616	✓			
Logging Machinery Operators	8241	✓			
Lumber Graders and Other Wood Processing Inspectors and Graders	9436	✓			
Other Wood Processing Machine Operators	9434	✓			
Paper Converting Machine Operators	9435	✓			
Papermaking and Coating Control Operators	9234	✓			
Papermaking and Finishing Machine Operators	9433	✓			
Pollution Control Technician	2231			✓	
Pulp Mill Machine Operators	9432	✓		✓	
Pulping Control Operators	9233	✓		✓	
Primary Production Managers (except Agriculture)	0911				✓
Sawmill Machine Operators	9431	✓			
Silviculture and Forestry Workers	8422	✓		✓	
Supervisors, Forest Products Processing	9215	✓		✓	
Supervisor, Logging and Forestry	8211	✓		✓	
Utilities Managers	0912			✓	✓

LINKAGES – *Forestry: Summary of Post-secondary Programs*

	PUBLIC COLLEGES											APPRENTICESHIP TRADE	PRIVATE COLLEGES						TECH. INST.		Banff	UNIVERSITIES				VOCATIONAL COLLEGES			
	Alberta College of Art & Design	Fairview College	Grande Prairie Regional College	Grant MacEwan Community College	Keyano College	Lakeland College	Lethbridge Community College	Medicine Hat College	Mount Royal College	Olds College	Red Deer College		Alberta College	Augustana University College	Canadian Union College	Concordia College	King's University College, The	North American Baptist College	Northern Alberta Institute of Technology	Southern Alberta Institute of Technology	Banff Centre	Athabasca University	University of Alberta	University of Calgary	University of Lethbridge	AVC - Calgary	AVC - Edmonton	AVC - Lac La Biche	AVC - Lesser Slave Lake
Biological Sciences (including degree programs in Biochemistry, Biology, Botany, Entomology, Genetics, Microbiology & Zoology)			1t2t	2t		1t		1t2t	2t		2t			B	B	B	B					B	BMPhD	BMPhD	BM				
Biological Sciences/Biomedical Engineering Technology (certificate & diploma programs with various specializations)											1t								D										
Environmental Science (various specializations in Conservation & Reclamation, Environmental Monitoring & Conservation Enforcement, Fish & Wildlife, Parks & Recreation, and Renewable Resource/Watershed Management)					1t	D	CD			CD						B2t	B		D		V		B	CM	B				C(34 w)
Environmental Technology/Water & Wastewater Technician									CD										C										C
Forestry, Forest Science/Technology			1t			1t		1t	1t		1t			1t		1t			D				BMPhD		1t				C
Forest/Logging Operations																												C	VC
Petroleum/Mineral Resource/Land Management										D										V	V								
Leisure, Tourism & Society/ Recreation Administration/Leisure (degree programs with various specializations)						C		1t			2t			1t		1t							BM	B	BM				
Physical Education (degree programs with various specializations)			2t	1t		1t		2t	D1t		2t			B	2t	1t							BMPhD	BM	BM				
Recreation, Leadership & Management/Leisure Services (certificate and diploma programs with various specializations)							CD	D	D											D								C	C

CODES:

B	Bachelor's Degree	D	Diploma (2 years)	w	weeks
M	Master's Degree	V	Varies	m	months
Ph.D.	Doctoral Degree	1t	One-year transfer	y	years
C	Certificate (1 year or less)	2t	Two-year transfer		

*Information taken from "It's About Time: To Start Thinking About Your Future," Advanced Education and Career Development, 1995.

CREDENTIALLING – *Credentialling Opportunities in Forestry*

The following credentialling opportunities link with modules in the Forestry strand. Further information (including current contacts) for these and other credentialling opportunities available to CTS students is available through Alberta Education's web site <http://ednet.edc.gov.ab.ca>.

Credential/Certificate	Training/ Credentialling Agency	Related CTS Strands/Modules	Program Description
All Terrain Vehicle Rider	Alberta Safety Council	FOR2120: Users in the Forest FOR3120: Integrated Resource Management CTR3040–3080: Practicum Modules	An industry-based credentialling program that offers certification in ATV use for recreational or industrial purposes. Deals with pre-ride inspection, range signals, rules and warm-up exercises, riding strategies, circles, turns, stops and traversing hills. Certificates are issued upon successful completion of an examination.
Bear Awareness and Avoidance: • Basic • Advanced	Alberta Safety Council	FOR1040: Woods Survival 1 FOR2040: Woods Survival 2 FOR1060: Measuring the Forest 1 FOR2060: Measuring the Forest 2 CTR3040–3080: Practicum Modules CTR2210: Workplace Safety	A safety awareness program that offer certification at two levels. Each course deals with species recognition and bear biology, bear behaviour, avoiding bear problems and bear deterrents. Certificates are issued upon successful completion of an examination.
First Aid in the Wilderness	St. John Ambulance	FOR1040: Woods Survival 1 FOR2040: Woods Survival 2 FOR1060: Measuring the Forest 1 FOR2060: Measuring the Forest 2 CTR3040–3080: Practicum Modules CTR2210: Workplace Safety	A credentialling program designed for individuals who work, live or play in wilderness or remote areas. Deals with how to cope with emergencies and provide first aid in remote settings where medical services are not available. Certificates are issued upon successful completion of an examination.
Canadian Tourism Industry Certification: • Outdoor Guide • Freshwater Angling Guide • Hunting Guide	Alberta Tourism Education Council	FOR1040: Woods Survival 1 FOR2040: Woods Survival 2 CTR3040–3080: Practicum Modules	Industry-based certification programs that address standards established by the tourism industry. Certificates are awarded to individuals who demonstrate occupational standards through written and practical testing.

FORESTRY

SECTION I: LEARNING RESOURCE GUIDE

This section of the GSI has been designed to provide a list of resources that support student learning.

Three types of resources are identified:

- Authorized: Resources authorized by Alberta Education for CTS curriculum; these resources are categorized as basic, support, or teaching
- Other: Titles provided as a service to assist local jurisdictions to identify resources that contain potentially useful ideas for teachers. Alberta Education has done a preliminary review of these resources, but further review will be necessary prior to use in school jurisdictions
- Additional: A list of local, provincial and national sources of information available to teachers, including the community, government, industry, and professional agencies and organizations.

The information contained in this Guide, although as complete and accurate as possible as of June 1997, is time-sensitive.

For the most up-to-date information on learning resources and newer editions/versions, consult the LRDC *Buyers Guide* and/or the agencies listed in the Distributor Directory at the end of this section.

CTS is on the Internet.
Internet Address:
http://ednet.edc.gov.ab.ca

TABLE OF CONTENTS

INTRODUCTION I.5
- CTS and the Resource-based Classroom I.5
- Purpose and Organization of this Document I.5
- How to Order I.6
- Resource Policy I.6

AUTHORIZED RESOURCES I.7
- Basic Learning Resources I.7
- Support Learning Resources I.8
- Teaching Resources I.15
- Forestry Resources (Correlation Charts) I.19

OTHER RESOURCES I.31

ADDITIONAL SOURCES I.41

DISTRIBUTOR DIRECTORY I.53

INTRODUCTION

CTS AND THE RESOURCE-BASED CLASSROOM

Career and Technology Studies (CTS) encourages teachers to establish a resource-based classroom, where a variety of appropriate, up-to-date print and nonprint resources are available. Learning resources identified for CTS strands include print, software, video and CD-ROM formats. Also of significance and identified as appropriate throughout each strand are sources of information available through the Internet.

The resource-based classroom approach accommodates a variety of instructional strategies and teaching styles, and supports individual or small group planning. It provides students with opportunities to interact with a wide range of information sources in a variety of learning situations. Students in CTS are encouraged to take an active role in managing their own learning. Ready access to a strong resource base enables students to learn to screen and use information appropriately, to solve problems, to meet specific classroom and learning needs, and to develop competency in reading, writing, speaking, listening and viewing.

PURPOSE AND ORGANIZATION OF THIS DOCUMENT

The purpose of this document is to help teachers identify a variety of resources to meet their needs and those of the students taking the new CTS curriculum. It is hoped that this practical guide to resources will help teachers develop a useful, accessible resource centre that will encourage students to become independent, creative thinkers.

This document is organized as follows:

- Authorized Resources:
    - – basic learning resources
    - – support learning resources
    - – teaching resources
- Other Resources
- Additional Sources
- Distributor Directory.

Some resources in the guide have been authorized for use in some or all of the CTS strands, e.g., the Career and Technology Studies video series produced by ACCESS: The Education Station. Further information is provided in relevant sections of this resource guide.

Each resource in the guide provides bibliographic information, an annotation where appropriate, and a module correlation to the CTS modules. The distributor code for each entry will facilitate ordering resources. It is recommended that teachers preview all resources before purchasing, or purchase one copy for their reference and additional copies as required.

Distributor Code - see Distributor Directory

Distributor Code	Resources		Levels/Mod. No.		
			1	2	3
ACC	Title	Author	1010	2010	3010
	Bibliographic Information				
	Annotation				

1 = Introductory
2 = Intermediate
3 = Advanced

Indicates module number

HOW TO ORDER

Most authorized resources are available from the Learning Resources Distributing Centre (LRDC) at:

12360 – 142 Street
Edmonton, AB T5L 4X9
Telephone: 403–427–5775 (outside of Edmonton dial 310–0000 to be connected toll free)
Fax: 403–422–9750
Internet: http://ednet.edc.gov.ab.ca/lrdc

Please check LRDC for availability of videos.

RESOURCE POLICY

Alberta Education withdraws learning and teaching resources from the provincial list of approved materials for a variety of reasons; e.g., the resource is out of print; a new edition has been published; the program has been revised. Under section 44 (2) of the *School Act*, school boards may approve materials for their schools, including resources that are withdrawn from the provincial list. **Many school boards have delegated this power to approve resources to school staff or other board employees under section 45 (1) of the *School Act*.**

For further information on resource policy and definitions, refer to the *Student Learning Resources Policy* and *Teaching Resources Policy* or contact:

Learning Resources Unit, Curriculum Standards Branch
Alberta Education
5th Floor, Devonian Building, East Tower
11160 Jasper Avenue
Edmonton, AB T5K 0L2
Telephone: 403–422–4872 (outside of Edmonton dial 310–0000 to be connected toll free)
Fax: 403–422–0576
Internet: http://ednet.edc.gov.ab.ca

Note: Owing to the frequent revisions of computer software and their specificity to particular computer systems, newer versions may not be included in this guide. However, schools may contact the LRDC directly at 403–427–5775 for assistance in purchasing computer software.

Trademark Notices: Microsoft, Access, Excel, FoxPro, Mail, MS-DOS, Office, PowerPoint, Project, Publisher, Visual Basic, Visual C++, Windows, Windows NT, Word, and Works are either registered trademarks or trademarks of Microsoft Corporation. Apple, Mac, Macintosh, and Power Macintosh are either registered trademarks or trademarks of Apple Computer, Inc. Other brand and product names are registered trademarks or trademarks of their respective holders.

AUTHORIZED RESOURCES

BASIC LEARNING RESOURCES

The following basic learning resources have been authorized by Alberta Education for use in the Forestry curriculum. These resources address the majority of the learner expectations in one or more modules and/or levels. A curriculum correlation appears in the right-hand column.

Distributor Code	Resources	Levels/Module No.		
		1	2	3
LRDC	*Ecosystems.* B. Herridge and B. Chernin. Gage Educational Publishing, 1995. The 72-page student text provides an illustrated introduction to ecosystems and a more in-depth look at living and nonliving factors and the roles they play in ecosystems. The text concludes with examples of human impacts on ecosystems and examines current issues from a variety of perspectives. The 500-page teacher's resource book provides teaching ideas correlated to the student text and suggestions regarding evaluation, supplementary resources and integrated projects. Blackline masters, reproducible for classroom use, are provided.	1010 1020 1090 1100	2010 2100	3010 3090 3120
LRDC	*Global Environment, The.* Steven Sterling and Sue Lyle. Mississauga, ON: Copp Clark Pitman, 1991. This text addresses a broad range of environmental issues within a global context. Issues are examined through a variety of stimulating activities, including case studies, discussion and role-playing.	1090 1100	2030 2100	3010
LRDC	*Investigating Terrestrial Ecosystems.* William A. Andrews. Scarborough, ON: Prentice-Hall Canada Inc., 1986. This student textbook focuses attention on the ecology of our planet and, more specifically, terrestrial ecosystems. The content is intended to assist students to identify and resolve environmental issues. The textbook investigates basic concepts of terrestrial ecosystems and examines specific biomes. Each chapter includes student-centred activities, case studies and suggestions for field studies.	1010 1020 1090		3090
LRDC	*Woodlot Management.* B. Wiskel. Lone Pine Publishing, 1995. This guide to sustainable, small-scale forest management applies recognized forestry principles and offers viable management options for rural and urban environments. The guide contains chapters on forest history, tree biology, woodlot assessment, silviculture, harvesting, reforestation and marketing forest products.	1060 1090	2030 2060 2120	3070 3090 3120

SUPPORT LEARNING RESOURCES

The following support learning resources are authorized by Alberta Education to assist in addressing some of the learner expectations of a module or components of modules.

Distributor Code	Resources	Levels/Module No.		
		1	2	3
LRDC	*Birders of a Feather*. Vancouver, BC: T.H.A. Media Distributors Ltd., 1993. Video. This video deals with the ecotourism dilemma in Beaverhill Lake, Mount Verde and Point Pellee. The positive and negative effects that ecotourism brings to human and natural communities are vividly portrayed.	1090 1100	2030 2100	3010 3090
FEESA	*Boreal Forest Series*. Friends of the Environmental Education Society of Alberta (FEESA). FEESA, An Environmental Education Society 1993/95. Videos. *Boreal Forest Issues, Boreal Forest I* - this 59-minute video explains the characteristics of Alberta's boreal forests, outlines the nature of forest use in society today and examines strategies used in forest management. Issues surrounding the use of our boreal forests are analyzed from both economic and environmental perspectives. The need for responsible decision making in forestry-related areas is emphasized throughout the video. *Between the Stands, Boreal Forest II* - represents the second of three one-hour videos that provide insight into the importance of issues related to the development and use of the largest of Alberta's and Canada's terrestrial ecosystems - the Boreal Forest. The video presents the very different viewpoints of two young, well-educated and well-meaning people on issue areas of ecosystem-based management, forest regeneration, forest harvest and conservation. *A Forest of Values, Boreal Forest III* - represents the third video in a three-part series that provide insight into issues related to the development and use of the Boreal Forest. The video presents the viewpoints of two people with different backgrounds who live in a community affected by large-scale forest development which is helping to redefine community and lifestyle values. Topics addressed include habitat, decision making, traditional values and economics. Utilization guides are available (see teaching resources).	1100	2010 2100 2120	3010 3120
ACC	*Career and Technology Studies: Key Concepts*. Edmonton, AB: ACCESS: The Education Station. A series of videos and utilization guides relevant to all CTS strands. The series consists of: *Anatomy of a Plan; Creativity; Electronic Communication; The Ethics Jungle; Go Figure; Innovation; Making Ethical Decisions; Portfolios; Project Planning; Responsibility* and *Technical Writing*.	all	all	all

Support Learning Resources (continued)

Distributor Code	Resources	Levels/Module No.		
		1	2	3
LRDC	*Forest is in Our Hands, The.* Edmonton, AB: Caterpillar Incorporated, 1991. Video. This video explores the need to make informed decisions regarding our use of forests and other natural resources. Information is presented in three parts: "Tending the Forest" (describes the science of silviculture); 'Sharing the Forest' (explores the concept of multiple-use management); and "Sustaining the Forest" (examines the crucial area of decision making). Viewers are reminded that there are at least two sides to every issue. A print component entitled "Forest Facts: The Forest is in our Hands" is available in booklet format.		2120	3010 3110 3120
ACC	*Forests Forever.* (Forests of the World.) NRK-TV. New Dimensions Media, 1993. Video. This video presents an overview of forest encroachment through a study of Norway, Korea, Burma and the Philippines. Each country is making progress in reforestation. Provides a basis for discussion on the fragility of forest ecology and how some planning options are providing solutions to deforestation.	1100	2070	3010
SSC	*From the Mountains to the Sea - A Journey in Environmental Citizenship.* Ottawa, ON: Environment Canada, 1992. Booklet. This student booklet provides a brief directory of various "eco" activities that can be implemented in the community, home and/or school.		2030	3010
LRDC	*How Much Is Enough? The Controversy Over How B.C.'s Forests Should Be Managed.* MacMillan Bloedell Limited, 1990. Video. The management of Earth's forests is a vital environmental issue. World attention has been recently focused on B.C.'s forests and forestry practises. *How Much Is Enough?* Is a Macmillan Bloedell sponsored video that explores both sides of the logging blockade in the Tsitika Valley and what is at stake for the people caught in the conflict. This documentary features forest workers from MacMillan Bloedell and environmentalists who share why they feel the Lower Tsitika Valley should be logged or preserved. Caught in the middle of this emotional dispute are forest-dependent communities on Vancouver Island. Emotions are heightened as each side tells its story through the news media.	1020 1100	2010 2100 2120	3010 3110 3120

Support Learning Resources (continued)

Distributor Code	Resources	Levels/Module No.		
		1	2	3
LRDC	*Identification Guide to the Trees of Canada.* Jean Lauriault. Markham, ON: Fitzhenry and Whiteside Limited, 1989. This reference guide identifies native trees of Canada. The book provides a distribution map for each species and detailed information about its leaves and fruit. The book also identifies some common ornamentals not native to Canada. Additional information is provided about the origin of names for tree species, the economic importance of trees, tree diseases, tree toxicity and the medical properties of trees. The book suggests some interesting activities related to the study of trees, including tips on how to start a leaf collection.	1020 1040	2040	3090
LRDC	*Logging (Singing Trees).* (W5.) CTV. Magic Lantern Communications, 1995. Video. British Columbia is holding up issuing a logging permit for the West Kootenays, because Gladys McIntyre and her group have convinced a few people that the trees have 'spiritual value' and actually sing. Some people involved in the logging industry debates worry that the 'lunatic fringe' is now influencing forest policy in British Columbia.	1010	2010	3010
ACP	*Nature's Legacy: A Southwestern Safari.* Randy Tomiuk Productions Ltd./Wildhorse Productions/R&L Peregrine Productions/Amoco Petroleum Co. Ltd., 1995. Video. Examines the wildlife of southwestern Alberta. Most of the region's shorebirds, prairie birds and raptors are shown. Some mammals are also examined. The emphasis is on identification and appreciation. A teacher's resource guide is available.	1090 1100	2010 2100	3010 3090
ACP	*Nature's Legacy: Alberta's Grasslands and Parklands.* Randy Tomiuk Productions Ltd./ Wildhorse Productions/R&L Peregrine Productions/Amoco Petroleum Co. Ltd., 1996. Video. This video describes the location, general features, history and unique wildlife common to two of Alberta's natural regions, the Grasslands and Parklands. Through natural photography and interviews, the video examines ecosystem dynamics within each natural region. Clearly, wildlife species shown in the video will only continue to exist if natural habitats within the Grasslands and Parklands are maintained. A teacher's resource guide is available.	1010 1020 1090	2010	

Support Learning Resources (continued)

Distributor Code	Resources	Levels/Module No.		
		1	2	3
ACP	*Nature's Legacy: Prairie Wildlife: A Complex Web.* Randy Tomiuk Productions Ltd./ Wildhorse Productions/R&L Peregrine Productions/Amoco Petroleum Co. Ltd., 1996. Video. This video introduces you to an often misunderstood creature that seems common, ordinary and of little value. Yet the Richardson's Ground Squirrel, or gopher, is vital to the survival of many prairie predators. The video examines the importance of this species to the delicate harmony of wildlife in Alberta's prairie grassland. A teacher resource guide is available.	1010 1090 1100	2010 2020	
ACP	*Nature's Legacy: Wildlife at Risk.* Randy Tomiuk Productions Ltd./Wildhorse Productions/R&L Peregrine Productions/Amoco Petroleum Co. Ltd., 1996. Video. This video describes the five categories of wildlife species at risk in Canada: (i.e., vulnerable, threatened, endangered, extirpated and extinct). Through natural photography and interviews, the video examines local wildlife species within each category, and factors contributing to their current status. Also explored are programs for the sustainable management of local species at risk. A teacher resource guide is available.	1010 1090	2010	
LRDC	*New Leaf: Real Sustainability for the Boreal Forest,* A. Karen Baitgailis and Barbara Allard. Western Canada Wilderness Committee, 1993. Video. This video proposes a plan for Alberta's boreal forest. Current forestry megaprojects are shown to be unsustainable, both environmentally and economically. The video provides a model for integrated, small scale, labour intensive economic development for northern Alberta that includes nature tourism, horse and machine selective logging, small sawmills, value-added wood products manufacturing and clean pulp mills. The focus in this video is supportive of environmental concerns taking precedence over economic development. Teachers should be prepared to provide a balance in perspective.		2120	3010 3120
LRDC	*One-Minute Readings: Issues in Science, Technology and Society.* R.F. Brinckerhoff, et al. Don Mills, ON: Addison-Wesley Publishing Company, 1992. This book contains readings and questions related to issues in science, technology and society. Applications of science are raising difficult questions and are creating problems that cannot be answered. The book is intended to give students practice in making the kinds of decisions they will experience in life. Students need a knowledge of science to find the best possible answers.			3010

Support Learning Resources (continued)

Distributor Code	Resources	Levels/Module No.		
		1	2	3
LRDC	*Place For Wildlife, A: A Way Is No Longer There.* Edmonton, AB: ACCESS: The Education Station, 1990. Video and Print. This video was produced with the goal of increasing public understanding of pressures facing Canadian wildlife; in particular, the continuing loss of habitat. The program features "A Way Is No Longer There", an original song about the common fate of wildlife and humans in our changing environment. A utilization guide in print format is available to teachers.	1090	2030	3010 3090
LRDC	*Singing In The Rain Forest (Warblers).* Vancouver, BC: T.H.A. Media Distributors Ltd. 1993. Video. This video describes the plight of many North American (Boreal) songbirds. Warblers are the main focus of attention. It provides a good overview of the bird's life cycle and migratory patterns. The video should be viewed with the understanding that many factors have attributed to the warblers' population decline (e.g., forest fires, urban expansion and agriculture).	1090 1100	2030 2100	3010 3090
LRDC	*Snow Camping: The Complete Guide to Enjoying the Back Country.* J.A. Creore. Lone Pine Publishing, 1992. This book explains how to camp in the winter, even in the snow, and enjoy it. Topics include choosing the proper equipment and clothing, food preparation, shelter, trip planning and survival, loading a pack and dealing with emergencies (e.g. injury, hypothermia and avalanches). The author is a recognized expert and has many trips and interesting suggestions to share.	1040	2040	
LRDC	*St. John Ambulance Knots and Whatnots: First Aid in the Wilderness Course Supplement.* St. John Ambulance Association, 1996. This well-illustrated booklet provides information and skills that will enhance an individual's ability to provide care in a remote setting when removed from medical aid. The book deals with pre-trip planning, wilderness skills, animals to avoid and medical evacuation. The content complements the training program 'First Aid in the Wilderness'.	1040	2040	
LRDC	*St. John Ambulance Official Wilderness First-Aid Guide.* W. Merry. McClelland & Stewart Inc., St. John Ambulance Association, 1996. This book is a comprehensive guide to meeting the special challenge of a medical emergency in the wilderness areas of the northern U.S., Canada and all other regions with a similar range of weather conditions. It takes you step-by-step through vital first-aid procedures, using language that is easy to understand and more than 130 illustrations. It contains information on cold exposure, bear attacks, dental emergencies, burns, gunshot wounds, broken bones, cleaning contaminated wounds and mushroom, berry and food poisoning.	1040	2040	

Support Learning Resources (continued)

Distributor Code	Resources	Levels/Module No.		
		1	2	3
LRDC	*This Living World: The Forest*. Edmonton, AB: Recreation, Parks and Wildlife Foundation, 1992. Video. The video present a historical perspective on the development of forests and the forest industry in Canada. Because forests provide a home for wildlife and serve many uses for human, it is necessary to protect and conserve them.	1010 1090 1100	2030 2100	3010
LRDC	*This Living World: Wildlife Habitat*. Edmonton, AB: Recreation, Parks and Wildlife Foundation, 1992. Video. This video informs viewers of the importance of "habitat" for living things. Interviews provide insight on issues concerning wildlife and their habitat (e.g., the need for ecological literacy, how habitat affects quality of life and the worldwide disappearance of natural habitats).	1010 1090 1100	2030 2100	3010
LRDC	*Trees*. N. Kelba, et al. Calgary, AB: Calgary Board of Education, 1992. Booklet. This booklet provides a variety of environmental investigations that are suited to the classroom and school yard. The investigations involve students in hands-on and participatory learning situations.	1020 1040 1090 1100	2030 2040	
ACC	*Trees of Life*. (Forests of the World.) NRK-TV. New Dimensions Media, 1993. Video. This video focuses on forestry issues in Peru, Russia, Canada and the U.S. Against a backdrop of Peru, where the lack of trees has brought on killer floods and erosion of top soil, the North American conflict between efforts to save forest homes and industrial development is highlighted.	1100	2070	3010
ACC	*Visions of Carmanah*. Omni Film Productions. Moving Images Distribution, 1992. Video. In the spring of 1989, over 100 of Canada's most gifted artists hiked into British Columbia's Carmanah Valley. As they wandered amidst the giant Sitka spruce, their common purpose was to experience and portray the magic and mystique of one of Canada's last remaining old growth forests. Their unique quest resulted in the book Carmanah: Artistic Visions of an Ancient Rainforest, in which the best of the work was published. This video features a broad spectrum of Canadian artists who speak about the importance of the wilderness not only as a source of artistic inspiration, but as a necessity for the health of the planet. Note: This video presents a political perspective and political event. Although presenting only one view on the issue of old growth rainforests, the video has the potential to contribute to the understanding of related issues if included as part of a package with other components on old growth rainforests, and within a critical thinking context.	1020	2100	3010 3090 3120

BEST COPY AVAILABLE

Support Learning Resources (continued)

Distributor Code	Resources	Levels/Module No.		
		1	2	3
LRDC	*Woodlot Management.* Alberta Agriculture, Food and Rural Development, 1996. Video. This video discusses many of today's farms that include woodlot areas. Trees that in the past had little or no value to the lumber industry are now in high demand. With careful planning, periodic harvesting and replanting, one can ensure a long-term supplemental income for farm operation, plus the benefits of a healthy sustainable forest for future generations.		2030	3010 3070 3110 3120
AFA	*Woodlot Management Information Series.* Edmonton, AB: Alberta Forestry Association, 1993. Brochures. This resource includes a series of 10 brochures that explain aspects of woodlot management in clear statements that use nontechnical vocabulary. The series includes *Taking Inventory of Your Forest Resources; Forests, Fish & Wildlife; Preparing a Management Plan; Business Plans for Woodlots; Logging & Selling Your Timber; Environmental Protection; Reforesting Your Woodlot; Practising Agroforestry in the Prairies; Add Value to Your Forest Products* and *Woodlot Management to Diversify Farm Income.*	1010 1100	2030 2060 2070 2100 2120	3010 3070 3110 3120
ACC	*Yew Tree, The: Its History and Its Uses.* Aspect Productions. New Dimensions Media, 1992. The Pacific yew tree is found only in the ancient forests of the Pacific Northwest. With the European species nearly extinct from overcutting and overuse, it is the Pacific yew that has gained international attention. Taxol, a substance found in the bark and needles of the tree, may be one of the major new treatments for ovarian and other cancers. This documentary covers all aspects of the yew tree - once a scorned and now a prized tree species in the Pacific Northwest.	1010 1020	2010	3010 3070

TEACHING RESOURCES

The following teaching resources are authorized by Alberta Education to assist teachers in the instructional process.

Distributor Code	Resources	Levels/Module No.		
		1	2	3
LRDC	*Alberta's Focus on Forests.* Edmonton, AB: Alberta Forestry Association, 1993. This guidebook for teachers focuses attention on the nature of forests and forest management in Alberta. Lessons outlined in the manual incorporate activity-based learning, cooperative learning and critical/creative thinking skills. Materials have been organized into five modules, which include Adaptations For Life (forest ecology), The Forest Tree, Conditions Affecting Growth, Forest Resources and Technologies, and Forest Management For All.	1010 1020 1050 1060 1090 1100	2070 2100	3070 3090
FEESA	*Boreal Forest Series.* Edmonton, AB: Friends of the Environmental Education Society of Alberta (FEESA), 1993/95. Utilization Guides. See Support Learning Resources for annotation and module correlation.			
LRDC	*Ecology Studies of Lakes in Alberta.* Edmonton, AB: Alberta Environment, 1988. Resource materials include book and teacher's package, 1989. This print package deals with the ecology of freshwater environments. The unit of study discusses human impact on lake environments and involves students in the methods and technology employed to study lakes. Workshops on how to use the materials are provided by Alberta Environment.	1090 1100	2030 2060 2100	3010 3090
LRDC	*Ecosystems.* B. Herridge and B. Chernin. Gage Educational Publishing, 1995. Teacher's Resource Booklet. See Basic Learning Resources for annotation and module correlation.			
OFA	*Forestry Manual For Ontario Secondary School Teachers, A.* G.R.Morrison. Ottawa, ON: The Ontario Forestry Association, 1990. Guidebook.	1020 1050 1060	2060 2070	3060 3070 3110
LRDC	*Importance of Wildlife to Canadians in 1987, The: Trends in Participation in Wildlife-Related Activities, 1981 to 2006.* F. L. Filion, et al. Ottawa, ON: Environment Canada, Canadian Wildlife Service, 1988. Booklet. This booklet addresses the consumptive and nonconsumptive use of wildlife. This booklet provides factual content that would be useful for individual student research and investigation.	1010 1060 1090 1100	2010 2060	3010 3060

Teaching Resources (continued)

Distributor Code	Resources	Levels/Module No.		
		1	2	3
LRDC	*Managing The Forest: Support Materials for a Secondary School Course in Intensive Forest Management.* Don Jacques. Vancouver, BC: The University of British Columbia, Western Education Development Group, 1985. Teacher Resource Manual. This resource manual provides ideas and activities to support a high school forestry course. The book is not a course in itself, but places activities in a developmental sequence so that teachers may use it as a guide to develop and present a variety of forestry concepts.	1050 1060	2060 2070 2120	3060 3070 3080 3110 3120
ACP	*Nature's Legacy: A Southwestern Safari.* Randy Tomiuk Productions Ltd./Wildhorse Productions/R&L Peregrine Productions/Amoco Petroleum Co. Ltd., 1995. Teacher's Resource Guide. See Support Learning Resources for annotation and module correlation.			
ACP	*Nature's Legacy: Alberta's Grasslands and Parklands.* Randy Tomiuk Productions Ltd./Wildhorse Productions/R&L Peregrine Productions/Amoco Petroleum Co. Ltd., 1996. Teacher's Resource Guide. See Support Learning Resources for annotation and module correlation.			
ACP	*Nature's Legacy: Prairie Wildlife: A Complex Web.* Randy Tomiuk Productions Ltd./Wildhorse Productions/R&L Peregrine Productions/Amoco Petroleum Co. Ltd., 1996. Teacher's Resource Guide. See Support Learning Resources for annotation and module correlation.			
ACP	*Nature's Legacy: Wildlife at Risk.* Randy Tomiuk Productions Ltd./Wildhorse Productions/R&L Peregrine Productions/Amoco Petroleum Co. Ltd., 1996. Teacher's Resource Guide. See Support Learning Resources for annotation and module correlation.			
LRDC	*National Occupational Standards For the Canadian Tourism Industry: Outdoor Guide.* Tourism Industry Association of Canada. Edmonton, AB: Alberta Tourism Education Council, 1991. Teacher's Booklet. This booklet contains competency standards that the tourism industry deems necessary for effective performance in the occupation of Outdoor Guide. The standards establish a base from which certification programs can be developed.	1040	2040	

Teaching Resources (continued)

Distributor Code	Resources	Levels/Module No.		
		1	2	3
LRDC	*Northern Bushcraft.* (Expanded edition.) Mors Kochanski. Edmonton, AB: Lone Pine Publishing Company, 1988. This book provides practical information for everyday living in the northern forest. It discuses basic existence skills that allow survival in challenging situations. Topics such as firecraft, axecraft, knifecraft, sawcraft, rope work and shelter are discussed.	1040	2040	
LRDC	*One-Minute Readings: Issues in Science, Technology and Society.* R.F. Brinckerhoff, et al. Don Mills, ON: Addison-Wesley Publishing Company, 1992. Teacher's Manual. See Basic Learning Resources for annotation and module correlation.			
LRDC	*Orienteering, Level I.* R. Robertson. Calgary, AB: Calgary Board of Education, 1982. Booklet. This booklet is designed to develop locomotor skills, map skills and space/time skills as they relate to orienteering. By using a variety of maps, the student's ability to "find his/her way" is developed. Activities for rural and urban geographical areas have been included.	1040 1050	2040	
LRDC	*Orienteering, Level II.* R. Robertson. Calgary, AB: Calgary Board of Education, 1980. Booklet. This booklet is designed to add the use of a compass to the fundamental orienteering skills of map reading, map making and map orientation. Activities address physical fitness and skills, knowledge and understanding, social skills, attitudes and appreciation. The material has been prepared for junior and senior high school students.	1040 1050	2040	
LRDC	*Personal Equipment.* N. Kelba, et al. Calgary, AB: Calgary Board of Education, 1983. Booklet. This booklet examines the role of personal equipment (its selection and use) in safe and comfortable outdoor experiences. Topics addressed include temperature regulation, essential equipment for various situations, selection of quality equipment, sources of equipment, care and maintenance of equipment, packing equipment and safety considerations.	1040	2040	

BEST COPY AVAILABLE

Teaching Resources (continued)

Distributor Code	Resources	Levels/Module No.		
		1	2	3
LRDC	*Project Wild Activity Guide*. Ottawa, ON: Canadian Wildlife Federation, 1993. Book. This book provides a collection on interdisciplinary environmental education materials and activities that emphasize wildlife conservation and environmental stewardship. Activities are indexed by topic, grade, subject and skill, and foster responsible behaviour and constructive actions concerning wildlife and the environment.	1010 1090 1100	2010 2100 2120	3010 3090 3120
LRDC	*Shelters*. N. Kelba, et al. Calgary, AB: Calgary Board of Education, 1983. Booklet. This booklet develops knowledge of planned and emergency shelters essential to outdoor experiences. Topics addressed include site selection, summer and winter constructed shelters, tents, bivouac sacks, improvised and permanent shelters.	1040	2040	
LRDC	*Trip Planning*. N. Kelba, et al. Calgary, AB: Calgary Board of Education, 1984. Booklet. This booklet outlines essential steps in planning successful outdoor education experiences. Planning should be based on an understanding of the potential hazards in the wilderness environment. The isolation factor of an outdoor trip shows the need for knowledge of emergency response, first aid and evacuation procedures. The booklet provides basic knowledge for the safety and enjoyment of outdoor experiences.	1040	2040	
AFA	*Woodlot Management Guide for the Prairie Provinces*. Farm Woodlot Association of Saskatchewan. Edmonton, AB: Alberta Forestry Association, 1993. This guide in binder format provides an introduction to forestry and a general overview of woodlot management. The guide is divided into four sections covering woodlot assessments, multiple land use, products and markets and woodlot management. Information provided is intended to help landowners understand their woodlots and develop appropriate goals for land use.	1010 1100	2030 2060 2070 2100 2120	3010 3070 3110 3120

FORESTRY RESOURCES

THEME CODE:
A. Social & Cultural Perspectives
B. Technology & Applications
C. Management & Conservation

FORMAT CODE:
p - Print
v - Video
s - Software

STATUS CODE:
B - Basic
S - Support
T - Teaching
O - Other

LEVEL CODE:
1 - Introductory
2 - Intermediate
3 - Advanced

JR/SR HIGH CODE:
J - Junior High
S - Senior High

	Format	*Status*	*Junior/Senior High*	Why Forestry?	Forest Regions Of Canada	Woods Survival 1	Mapping & Aerial Photos	Measuring The Forest 1	Forest Ecology 1	Forests Forever 1	Making A Difference	Managing Alberta Forests	Woods Survival 2	Measuring The Forest 2	Harvest Practices	Forests Forever 2	Users In The Forest	Issues In Forestry	Measuring the Forest 3	The Forest Marketplace	Forest Technology Applications	Forest Ecology 2	Silviculture	Integrated Resource Management
LEVEL				1	1	1	1	1	1	1	2	2	2	2	2	2	2	3	3	3	3	3	3	3
THEME				A	A	A	B	B	C	C	A	A	A	B	B	C	C	A	B	B	B	C	C	C
Module Number				1010	1020	1040	1050	1060	1090	1100	2010	2030	2040	2060	2070	2100	2120	3010	3060	3070	3080	3090	3110	3120
Alberta's Focus on Forests	*p*	T	J/S	X	X		X	X	X	X					X	X				X		X		
Birders of a Feather	*v*	S	J/S						X	X		X				X	X	X				X		
Boreal Forest Series:										X	X					X		X						X
Boreal Forest Issues, Boreal Forest I	*v*	S	J/S																					
Between the Stands, Boreal Forest II	*v*	S	J/S																					
A Forest of Values, Boreal Forest III	*v*	S	J/S																					
Utilization Guides	*p*	T	J/S																					
Ecology Studies of Lakes of Alberta	*p*	T	J/S						X	X		X		X		X		X				X		
Ecosystems				X	X				X	X	X							X				X		X
Text	*p*	B	J/S																					
Teacher's Resource Booklet	*p*	T	J/S																					
Forest Is In Our Hands, The	*v*	S	S														X	X					X	X
Forests Forever	*v*	S	J/S							X					X			X						
Forestry Manual For Ontario Secondary School Teachers, A	*p*	T	J/S		X		X	X						X	X				X	X			X	

FORESTRY RESOURCES

THEME CODE:
A. Social & Cultural Perspectives
B. Technology & Applications
C. Management & Conservation

FORMAT CODE:
p - Print
v - Video
s - Software

STATUS CODE:
B - Basic
S - Support
T - Teaching
O - Other

LEVEL CODE:
1 - Introductory
2 - Intermediate
3 - Advanced

JR/SR HIGH CODE:
J - Junior High
S - Senior High

LEVEL				1	1	1	1	1	1	1	2	2	2	2	2	2	2	3	3	3	3	3	3	3
THEME				A	A	A	B	B	C	C	A	A	A	B	B	C	C	A	B	B	B	C	C	C
	Format	*Status*	*Junior/Senior High*	Why Forestry?	Forest Regions Of Canada	Woods Survival 1	Mapping & Aerial Photos	Measuring The Forest 1	Forest Ecology 1	Forests Forever 1	Making A Difference	Managing Alberta Forests	Woods Survival 2	Measuring The Forest 2	Harvest Practices	Forests Forever 2	Users In The Forest	Issues In Forestry	Measuring the Forest 3	The Forest Marketplace	Forest Technology Applications	Forest Ecology 2	Silviculture	Integrated Resource Management
Module Number				1010	1020	1040	1050	1060	1090	1100	2010	2030	2040	2060	2070	2100	2120	3010	3060	3070	3080	3090	3110	3120
From the Mountains to the Sea: A Journey in Environmental Citizenship	*p*	S	S									X						X						
Global Environment, The	*p*	B	J/S						X	X		X				X		X						
How Much is Enough? The Controversy Over How B.C.'s Forests Should Be Managed	*v*	S	J/S		X					X	X					X	X	X					X	X
Identification Guide to the Trees of Canada	*p*	S	J/S		X	X							X									X		
Importance of Wildlife to Canadians, The	*p*	T	J/S	X				X	X	X	X			X				X	X					
Investigating Terrestrial Ecosystems	*p*	B	J/S	X	X				X													X		
Logging	*v*	S	J/S	X							X							X						
Managing the Forest: Support Materials for a Secondary School Course in Intensive in Intensive Forest Management	*p*	T	S				X	X						X	X		X		X	X	X		X	X
National Occupational Standards: Outdoor Guide	*p*	T	J/S			X							X											
Nature's Legacy: A Southwestern Safari																								
Video	*v*	S	J/S						X	X	X					X		X				X		
Teacher's Resource Guide	*p*	T	J/S																					

411

412

FORESTRY RESOURCES

THEME CODE:
A. Social & Cultural Perspectives
B. Technology & Applications
C. Management & Conservation

FORMAT CODE:
p - Print
v - Video
s - Software

STATUS CODE:
B - Basic
S - Support
T - Teaching
O - Other

LEVEL CODE:
1 - Introductory
2 - Intermediate
3 - Advanced

JR/SR HIGH CODE:
J - Junior High
S - Senior High

	Format	*Status*	*Junior/Senior High*	Why Forestry?	Forest Regions Of Canada	Woods Survival 1	Mapping & Aerial Photos	Measuring The Forest 1	Forest Ecology 1	Forests Forever 1	Making A Difference	Managing Alberta Forests	Woods Survival 2	Measuring The Forest 2	Harvest Practices	Forests Forever 2	Users In The Forest	Issues In Forestry	Measuring the Forest 3	The Forest Marketplace	Forest Technology Applications	Forest Ecology 2	Silviculture	Integrated Resource Management
LEVEL				1	1	1	1	1	1	1	2	2	2	2	2	2	2	3	3	3	3	3	3	3
THEME				A	A	A	B	B	C	C	A	A	A	B	B	C	C	A	B	B	B	C	C	C
Module Number				1010	1020	1040	1050	1060	1090	1100	2010	2030	2040	2060	2070	2100	2120	3010	3060	3070	3080	3090	3110	3120
Nature's Legacy: Alberta's Grasslands and Parklands																								
Video	*v*	S	J/S	X	X				X		X													
Teacher's Resource Guide	*p*	T	J/S																					
Nature's Legacy: Prairie Wildlife: A Complex Web																								
Video	*v*	S	J/S	X					X	X	X						X							
Teacher's Resource Guide	*p*	T	J/S																					
Nature's Legacy: Wildlife at Risk																								
Video	*v*	S	J/S	X					X		X													
Teacher's Resource Guide	*p*	T	J/S																					
New Leaf, A: Real Sustainability for the Boreal Forest	*v*	S	S														X	X						X
Northern Bushcraft	*p*	T	J			X							X											
One Minute Readings: Issues in Science, Technology and Society																		X						
Text	*p*	S	S																					
Teacher's Manual	*p*	T	S																					

FORESTRY RESOURCES

THEME CODE:
A. Social & Cultural Perspectives
B. Technology & Applications
C. Management & Conservation

FORMAT CODE:
p - Print
v - Video
s - Software

STATUS CODE:
B - Basic
S - Support
T - Teaching
O - Other

LEVEL CODE:
1 - Introductory
2 - Intermediate
3 - Advanced

JR/SR HIGH CODE:
J - Junior High
S - Senior High

Module Number	*Format*	*Status*	*Junior/Senior High*	Why Forestry? 1010	Forest Regions Of Canada 1020	Woods Survival 1 1040	Mapping & Aerial Photos 1050	Measuring The Forest 1 1060	Forest Ecology 1 1090	Forests Forever 1 1100	Making A Difference 2010	Managing Alberta Forests 2030	Woods Survival 2 2040	Measuring The Forest 2 2060	Harvest Practices 2070	Forests Forever 2 2100	Users In The Forest 2120	Issues In Forestry 3010	Measuring the Forest 3 3060	The Forest Marketplace 3070	Forest Technology Applications 3080	Forest Ecology 2 3090	Silviculture 3110	Integrated Resource Management 3120
LEVEL				1	1	1	1	1	1	1	2	2	2	2	2	2	2	3	3	3	3	3	3	3
THEME				A	A	A	B	B	C	C	A	A	A	B	B	C	C	A	B	B	B	C	C	C
Orienteering, Level I	*p*	T	J/S			X	X						X											
Orienteering, Level II	*p*	T	J/S			X	X						X											
Personal Equipment	*p*	T	J/S			X							X											
Place for Wildlife, A: A Way Is No Longer There									X			X						X				X		
Video	*v*	S	J/S																					
Utilization Guide	*p*	S	J/S																					
Project Wild Activity Guide	*p*	T	J/S	X					X	X	X					X	X	X				X		X
Shelters	*p*	T	J/S			X							X											
Singing in the Rainforest	*v*	S	J/S						X	X		X				X		X				X		X
Snow Camping: The Complete Guide to Enjoying the Back Country	*p*	S	J/S			X							X											
St. John Ambulance Knots and Whatnots: First Aid in the Wilderness Course Supplement	*p*	S	J/S			X							X											
St. John Ambulance Official Wilderness: First-Aid Guide	*p*	S	J/S			X							X											
This Living World: The Forest	*v*	S	J/S	X					X	X		X				X		X						

FORESTRY RESOURCES

THEME CODE:
A. Social & Cultural Perspectives
B. Technology & Applications
C. Management & Conservation

FORMAT CODE:
p - Print
v - Video
s - Software

STATUS CODE:
B - Basic
S - Support
T - Teaching
O - Other

LEVEL CODE:
1 - Introductory
2 - Intermediate
3 - Advanced

JR/SR HIGH CODE:
J - Junior High
S - Senior High

	Format	*Status*	*Junior/Senior High*	Why Forestry?	Forest Regions Of Canada	Woods Survival 1	Mapping & Aerial Photos	Measuring The Forest 1	Forest Ecology 1	Forests Forever 1	Making A Difference	Managing Alberta Forests	Woods Survival 2	Measuring The Forest 2	Harvest Practices	Forests Forever 2	Users In The Forest	Issues In Forestry	Measuring the Forest 3	The Forest Marketplace	Forest Technology Applications	Forest Ecology 2	Silviculture	Integrated Resource Management
LEVEL				1	1	1	1	1	1	1	2	2	2	2	2	2	2	3	3	3	3	3	3	3
THEME				A	A	A	B	B	C	C	A	A	A	B	B	C	C	A	B	B	B	C	C	C
Module Number				1010	1020	1040	1050	1060	1090	1100	2010	2030	2040	2060	2070	2100	2120	3010	3060	3070	3080	3090	3110	3120
This Living World: Wildlife Habitat	*v*	S	J/S	X					X	X		X				X		X						
Trees	*p*	S	J/S		X	X			X	X		X	X											
Trees of Life	*v*	S	J/S							X					X			X						
Trip Planning	*p*	T	J/S			X							X											
Visions of Carmanah	*v*	S	J/S		X											X		X				X		X
Woodlot Management	*p*	B	J/S					X	X			X		X			X			X		X		X
Woodlot Management	*v*	S	J/S									X						X		X			X	X
Woodlot Management Guide for the Praire Provinces	*p*	T	J/S	X						X		X		X	X	X	X	X		X			X	X
Woodlot Management Information Series	*p*	S	J/S	X						X		X		X	X	X	X	X		X			X	X
Yew Tree, The: Its History and Its Uses	*p*	S	J/S	X	X						X							X		X				
OTHER RESOURCES																								
Alberta Timber Harvest Planning and Operating Ground Rules	*p*	O	S								X					X	X							X
Alberta's Forests	*p*	O	J	X	X					X														
Alberta's Managed Forests	*p*	O	S													X	X							X

FORESTRY RESOURCES

THEME CODE:
A. Social & Cultural Perspectives
B. Technology & Applications
C. Management & Conservation

FORMAT CODE:
p - Print
v - Video
s - Software

STATUS CODE:
B - Basic
S - Support
T - Teaching
O - Other

LEVEL CODE:
1 - Introductory
2 - Intermediate
3 - Advanced

JR/SR HIGH CODE:
J - Junior High
S - Senior High

LEVEL				1	1	1	1	1	1	1	2	2	2	2	2	2	2	3	3	3	3	3	3	3
THEME				A	A	A	B	B	C	C	A	A	A	B	B	C	C	A	B	B	B	C	C	C
	Format	*Status*	*Junior/Senior High*	Why Forestry?	Forest Regions Of Canada	Woods Survival 1	Mapping & Aerial Photos	Measuring The Forest 1	Forest Ecology 1	Forests Forever 1	Making A Difference	Managing Alberta Forests	Woods Survival 2	Measuring The Forest 2	Harvest Practices	Forests Forever 2	Users In The Forest	Issues In Forestry	Measuring the Forest 3	The Forest Marketplace	Forest Technology Applications	Forest Ecology 2	Silviculture	Integrated Resource Management
Module Number				1010	1020	1040	1050	1060	1090	1100	2010	2030	2040	2060	2070	2100	2120	3010	3060	3070	3080	3090	3110	3120
Alberta's Public Land and Resources - Planning For the Future	*p*	O	S								X					X	X							X
Alberta's Threatened Wildlife Series	*p*	O	J/S			X							X											
Animal Tracks of Western Canada	*p*	O	J/S			X							X											
Benefits of Wildlife, The	*p*	O	J/S	X							X							X						
Canada's Eight Forest Regions	*p*	O	J		X				X															
Canada's Forest Heritage	*p*	O	J	X																				
Canoeing	*p*	O	J/S			X							X											
Canoe Tripping	*p*	O	J/S			X							X											
Caring For the Land Teaching Kit	*p*	O	J	X					X	X														
Dictionary of Natural Resource Management	*p*	O	J/S	X					X	X	X	X				X	X	X				X		X
Earth Keepers: Four Keys for Helping Young People Live in Harmony With the Earth	*p*	O	J/S			X					X		X											
Earthwalks: Acclimatization for a Sensory Encounter with the Natural World	*p*	O	J/S			X					X		X											
Ecology of a Temperate Ancient Rainforest	*v*	O	S													X	X	X						X

FORESTRY RESOURCES

THEME CODE:
A. Social & Cultural Perspectives
B. Technology & Applications
C. Management & Conservation

FORMAT CODE:
p - Print
v - Video
s - Software

STATUS CODE:
B - Basic
S - Support
T - Teaching
O - Other

LEVEL CODE:
1 - Introductory
2 - Intermediate
3 - Advanced

JR/SR HIGH CODE:
J - Junior High
S - Senior High

LEVEL				1	1	1	1	1	1	1	2	2	2	2	2	2	2	3	3	3	3	3	3	3
THEME				A	A	A	B	B	C	C	A	A	A	B	B	C	C	A	B	B	B	C	C	C
	Format	*Status*	*Junior/Senior High*	Why Forestry?	Forest Regions Of Canada	Woods Survival 1	Mapping & Aerial Photos	Measuring The Forest 1	Forest Ecology 1	Forests Forever 1	Making A Difference	Managing Alberta Forests	Woods Survival 2	Measuring The Forest 2	Harvest Practices	Forests Forever 2	Users In The Forest	Issues In Forestry	Measuring the Forest 3	The Forest Marketplace	Forest Technology Applications	Forest Ecology 2	Silviculture	Integrated Resource Management
Module Number				1010	1020	1040	1050	1060	1090	1100	2010	2030	2040	2060	2070	2100	2120	3010	3060	3070	3080	3090	3110	3120
Ecoregions of Alberta	*p*	O	J		X																			
Environmental Citizenship Series: Nature of Canada, The: A Primer on Spaces and Species	*p*	O	J/S	X					X	X	X							X				X		X
Environmental Citizenship Series: A Primer on Climate Change	*p*	O	S									X				X		X				X		
Environmental Citizenship Series: A Primer on Environmental Citizenship	*p*	O	J/S	X					X		X							X				X		X
Fact Sheet: The Forest Tent Caterpillar	*p*	O	J/S							X													X	
Farming Canada's Forest - Forest Management and Silviculture	*p*	O	S																				X	
Fifty More Things You Can Do To Save the Earth	*p*	O	J	X						X		X												
Fires and Stoves	*p*	O	J			X							X											
First Harvest, The	*p*	O	J	X						X														
Focus On Series	*p*	O	J/S						X	X		X				X		X				X		
Forest Care: Codes of Practice	*p*	O	S													X	X						X	X
Forest Explorers, The	*p*	O	J	X					X	X														

FORESTRY RESOURCES

THEME CODE:
A. Social & Cultural Perspectives
B. Technology & Applications
C. Management & Conservation

FORMAT CODE:
p - Print
v - Video
s - Software

STATUS CODE:
B - Basic
S - Support
T - Teaching
O - Other

LEVEL CODE:
1 - Introductory
2 - Intermediate
3 - Advanced

JR/SR HIGH CODE:
J - Junior High
S - Senior High

	Format	*Status*	*Junior/Senior High*	Why Forestry? 1010	Forest Regions Of Canada 1020	Woods Survival 1 1040	Mapping & Aerial Photos 1050	Measuring The Forest 1 1060	Forest Ecology 1 1090	Forests Forever 1 1100	Making A Difference 2010	Managing Alberta Forests 2030	Woods Survival 2 2040	Measuring The Forest 2 2060	Harvest Practices 2070	Forests Forever 2 2100	Users In The Forest 2120	Issues In Forestry 3010	Measuring the Forest 3 3060	The Forest Marketplace 3070	Forest Technology Applications 3080	Forest Ecology 2 3090	Silviculture 3110	Integrated Resource Management 3120
LEVEL				1	1	1	1	1	1	1	2	2	2	2	2	2	2	3	3	3	3	3	3	3
THEME				A	A	A	B	B	C	C	A	A	A	B	B	C	C	A	B	B	B	C	C	C
Module Number				1010	1020	1040	1050	1060	1090	1100	2010	2030	2040	2060	2070	2100	2120	3010	3060	3070	3080	3090	3110	3120
Forest Insect Pests in Canada	*p*	O	J/S						X	X						X		X				X	X	
Forest Land Use Zones	*p*	O	S								X					X	X							X
Forest Landscape Management Guidelines for Alberta	*p*	O	S								X					X	X							X
Forest Line	*p*	O	J/S							X		X				X		X						
Forest Regions of Canada	*p*	O	J		X																			
Forest, The: Understanding It, Using It, Keeping It	*p*	O	J/S	X	X				X	X					X	X				X		X		
Forestry on the Hill	*p*	O	S							X					X	X								
Forests and Water	*p*	O	J	X					X	X														
Forests For the Future - Pine Ridge Forest Nursery	*p*	O	J/S							X						X							X	
Framework for Alberta's Special Places, A	*p*	O	J/S		X					X		X				X								
Freshwater Ecosystems	*p*	O	J			X			X				X											
From Watershed to Watermark	*p*	O	S												X					X	X			
Genetics and Tree Improvement	*p*	O	S																				X	

FORESTRY RESOURCES

THEME CODE:
A. Social & Cultural Perspectives
B. Technology & Applications
C. Management & Conservation

FORMAT CODE:
p - Print
v - Video
s - Software

STATUS CODE:
B - Basic
S - Support
T - Teaching
O - Other

LEVEL CODE:
1 - Introductory
2 - Intermediate
3 - Advanced

JR/SR HIGH CODE:
J - Junior High
S - Senior High

Module Number	*Format*	*Status*	*Junior/Senior High*	1010 Why Forestry?	1020 Forest Regions Of Canada	1040 Woods Survival 1	1050 Mapping & Aerial Photos	1060 Measuring The Forest 1	1090 Forest Ecology 1	1100 Forests Forever 1	2010 Making A Difference	2030 Managing Alberta Forests	2040 Woods Survival 2	2060 Measuring The Forest 2	2070 Harvest Practices	2100 Forests Forever 2	2120 Users In The Forest	3010 Issues In Forestry	3060 Measuring the Forest 3	3070 The Forest Marketplace	3080 Forest Technology Applications	3090 Forest Ecology 2	3110 Silviculture	3120 Integrated Resource Management
LEVEL				1	1	1	1	1	1	1	2	2	2	2	2	2	2	3	3	3	3	3	3	3
THEME				A	A	A	B	B	C	C	A	A	A	B	B	C	C	A	B	B	B	C	C	C
Guide to the Common Native Trees and Shrubs of Alberta	*p*	O	S	X	X	X			X				X									X		
Grazing in the Green Area	*p*	O	S								X					X	X							X
Green Future: How To Make a World of Difference	*p*	O	J/S							X		X				X		X						
Green Guide (Series I and II)	*v*	O	S									X						X						
Green Tree Trailblazer Leader Manual	*p*	O	J/S			X			X				X										X	
Growing Opportunity, A: Alberta's Forest Resources	*p*	O	J	X						X														
Hinterland Who's Who Series	*p*	O	J/S							X						X								
How Green Is Your School	*p*	O	J/S							X		X				X		X						
Human Environments	*p*	O	J/S			X			X	X		X	X											
Industrial Land Disturbance and Reclamation in Forest Areas	*p*	O	S								X					X	X							X
Kananaskis County Environmental Education Teaching Activity Guide	*p*	O	J			X			X				X											

FORESTRY RESOURCES

THEME CODE:
A. Social & Cultural Perspectives
B. Technology & Applications
C. Management & Conservation

FORMAT CODE:
p - Print
v - Video
s - Software

STATUS CODE:
B - Basic
S - Support
T - Teaching
O - Other

LEVEL CODE:
1 - Introductory
2 - Intermediate
3 - Advanced

JR/SR HIGH CODE:
J - Junior High
S - Senior High

	Format	*Status*	*Junior/Senior High*	Why Forestry? 1010	Forest Regions Of Canada 1020	Woods Survival 1 1040	Mapping & Aerial Photos 1050	Measuring The Forest 1 1060	Forest Ecology 1 1090	Forests Forever 1 1100	Making A Difference 2010	Managing Alberta Forests 2030	Woods Survival 2 2040	Measuring The Forest 2 2060	Harvest Practices 2070	Forests Forever 2 2100	Users In The Forest 2120	Issues In Forestry 3010	Measuring the Forest 3 3060	The Forest Marketplace 3070	Forest Technology Applications 3080	Forest Ecology 2 3090	Silviculture 3110	Integrated Resource Management 3120
LEVEL				1	1	1	1	1	1	1	2	2	2	2	2	2	2	3	3	3	3	3	3	3
THEME				A	A	A	B	B	C	C	A	A	A	B	B	C	C	A	B	B	B	C	C	C
Module Number																								
Key Issues Relating to the Alberta Forest Industry	*p*	O	S								X					X	X							X
Land Conservation Education Program	*p*	O	J/S						X	X		X				X		X				X		
Mammals of the Northern Rockies	*p*	O	J/S		X	X				X			X			X								
Managing Your Woodland: A Non-Forester's Guide to Small-Scale Forestry in British Columbia	*p*	O	J/S				X	X						X	X		X		X	X			X	X
Manual of Pest Control, The	*p*	O	J/S													X						X	X	
Mosses Lichens & Ferns of Northwest North America: A Photographic Field Guide	*p*	O	J		X	X			X				X											
Native Trees of Alberta	*p*	O	J		X	X			X															
Natural Regions of Alberta: Poster Series	*p*	O	J	X	X				X															
Navigation	*p*	O	J			X	X																	
Nutrition	*p*	O	J			X							X											
Our Growing Resource - Alberta's Forest Industry ... Meeting Global Challenges	*p*	O	S											X						X	X		X	
Perils of Pulp (W5 Series)	*v*	O	S															X						

FORESTRY RESOURCES

THEME CODE:
A. Social & Cultural Perspectives
B. Technology & Applications
C. Management & Conservation

FORMAT CODE:
p - Print
v - Video
s - Software

STATUS CODE:
B - Basic
S - Support
T - Teaching
O - Other

LEVEL CODE:
1 - Introductory
2 - Intermediate
3 - Advanced

JR/SR HIGH CODE:
J - Junior High
S - Senior High

Module Number	*Format*	*Status*	*Junior/Senior High*	Why Forestry? 1010	Forest Regions Of Canada 1020	Woods Survival 1 1040	Mapping & Aerial Photos 1050	Measuring The Forest 1 1060	Forest Ecology 1 1090	Forests Forever 1 1100	Making A Difference 2010	Managing Alberta Forests 2030	Woods Survival 2 2040	Measuring The Forest 2 2060	Harvest Practices 2070	Forests Forever 2 2100	Users In The Forest 2120	Issues In Forestry 3010	Measuring the Forest 3 3060	The Forest Marketplace 3070	Forest Technology Applications 3080	Forest Ecology 2 3090	Silviculture 3110	Integrated Resource Management 3120
LEVEL				1	1	1	1	1	1	1	2	2	2	2	2	2	2	3	3	3	3	3	3	3
THEME				A	A	A	B	B	C	C	A	A	A	B	B	C	C	A	B	B	B	C	C	C
Pesticide Education Program	*p*	O	J/S						X	X						X						X	X	
Plants of the Western Boreal and Aspen Parkland	*p*	O	J/S		X				X													X	X	
Reforestation in Alberta	*p*	O	S												X								X	
Resource Road Planning Guidelines	*p*	O	S								X					X	X							X
Spruce Budwork Management	*p*	O	J/S							X													X	
Sunship Earth: An Acclimatization Program for Outdoor Learning	*p*	O	J/S			X					X		X											
Sustainable Forests - A Canadian Commitment	*p*	O	J/S	X	X										X	X	X	X		X	X			X
Timber Harvesting	*p*	O	S												X									
Timber Harvesting and the Environment	*p*	O	S								X					X	X							X
Timber Quota Policy	*p*	O	S								X					X	X							X
Trees and Shrubs of Alberta: A Habitat Field Guide	*p*	O	J/S	X	X	X						X												
Trees in Canada	*p*	O	J/S	X	X				X				X									X		
Water in Alberta: The Living Flow	*p*	O	S									X		X		X		X				X		
What We Can Do For Our Environment: Hundreds of Things to Do Now	*p*	O	J/S							X		X				X		X						

OTHER RESOURCES

These titles are provided as a service only to assist local jurisdictions to identify resources that contain potentially useful ideas for teachers. Alberta Education has done a preliminary review of the resources. However, the responsibility to evaluate these resources prior to selection rests with the user, in accordance with any existing local policy.

Distributor Code	Other Resources	Levels/Module No.		
		1	2	3
EPPC	*Alberta Timber Harvest Planning and Operating Ground Rules.* Edmonton, AB: Alberta Forestry, Lands and Wildlife, 1986. Book.		2010 2100 2120	3120
EPPC	*Alberta's Forests.* Edmonton, AB: Alberta Forestry, Lands and Wildlife, 1988.	1010 1020 1100		
EPPC	*Alberta's Managed Forests.* Edmonton: Alberta, AB Forest Service. Book.		2100 2120	3120
EPPC	*Alberta's Public Land and Resources - Planning for the Future.* Edmonton, AB: Alberta Forestry, Lands and Wildlife. Book.		2010 2100 2120	3120
EPPC	*Alberta's Threatened Wildlife Series.* Edmonton, AB: Alberta Environmental Protection. Factsheet Series.	1040	2040	
LPP	*Animal Tracks of Western Canada.* Joanne Barwise. Edmonton, AB: Lone Pine Publishing, 1989. Book. An easy-to-use guide to the tracks of common mammals in Alberta. This book contains a key to tracks as well as brief descriptions of the animals themselves.	1040	2040	
SSC	*Benefits of Wildlife, The.* Ottawa, Canada: Canadian Wildlife Service, 1990. Booklet.	1010	2010	3010
SSC	*Canada's Eight Forest Regions.* Ottawa, ON: Environment Canada, Forestry Service, 1974. Pamphlet.	1020 1090		
FOCA	*Canada's Forest Heritage.* Canadian Council of Forest Ministers. Ottawa, ON: Forestry Canada, 1986. Book.	1010		
CBE	*Canoeing.* B. Hans, et al. Calgary, AB: Calgary Board of Education, 1980. Booklet.	1040	2040	

Other Resources (continued)

Distributor Code	Other Resources	Levels/Module No		
		1	2	3
CBE	*Canoe Tripping.* N. Kelba, et al. Calgary, AB: Calgary Board of Education, 1983. Booklet.	1040	2040	
ENED	*Caring For the Land Teaching Kit* (Grades 7–9). Edmonton, AB: Alberta Environmental Protection, Education Branch, 1993. Teacher's Guide and Student Material.	1010 1090 1100		
UBCP	*Dictionary of Natural Resource Management.* J. Dunster. UBC Press, 1995. This dictionary provides an up-to-date and comprehensive source of natural resource management terms. It includes more than 6000 entries, extensively cross-referenced and illustrated to provide exact meanings. Encourages terminology from a wide range of disciplines and is based on information obtained from discussions with experts around the world. A useful resource for those involved in managing the planet's natural resources.	1010 1090 1100	2010 2030 2100 2120	3010 3090 3120
INEE	*Earth Keepers: Four Keys for Helping Young People Live in Harmony With the Earth.* Van Matre/Johnson. Calgary, AB: The Institute for Earth Education, 1987. Book. Four keys for helping young people live in harmony with the earth.	1040	2010 2040	
INEE	*Earthwalks: Acclimatization Walks for a Sensory Encounter with the Natural World (Earthwalks: Earth Magic and Snow Walks).* K. Hoesse. Calgary, AB: The Institute for Earth Education, 1980. Book. A collection of natural awareness activities which can be used as the components of a nature awareness walk.	1040	2010 2040	
NDM	*Ecology of a Temperate Ancient Rain Forest.* Survival/Anglia. Eugene, OR: New Dimension Media. 1991. Video.		2100 2120	3010 3120
EPPC	*Ecoregions of Alberta.* Edmonton, AB: Alberta Forestry, Lands and Wildlife, 1992. Book.	1020		
ENCA	*Environmental Citizenship Series: Nature of Canada, The: A Primer on Spaces and Species.* Ottawa, ON: Environment Canada, 1993. Booklet. This resource is designed to provide information that will help Canadians make environmentally responsible decisions. It provides short information anecdotes, maps and charts, questions and answers designed to promote critical thinking. The resource includes activities that can be initiated in the classroom or community. The book is one of a series of Environmental Citizenship Primers.	1010 1090 1100	2010	3010 3090 3120

Other Resources (continued)

Distributor Code	Other Resources	Levels/Module No		
		1	2	3
ENCA	*Environmental Citizenship Series: A Primer on Climate Change.* Christine Hogan. Ottawa, ON: Environment Canada, 1993. Booklet. This instructor source book provides information about climate change, the greenhouse effect, human activities contributing to the greenhouse effect, current scientific initiatives, potential impacts (especially on Canada) and strategies for personal response to the issue. This book will assist the teacher to develop learning projects and programs that address global warming.		2030 2100	3010 3090
ENCA	*Environmental Citizenship Series: A Primer on Environmental Citizenship.* . Ottawa, ON: Environment Canada, 1993. Booklet. This resource is designed to provide information that will help Canadians make environmentally responsible decisions. It provides short informational anecdotes, maps and charts, and questions/answers designed to provide critical thinking. The resource includes information on ecological processes, relationships of human societies with the environment, and key environmental issues that Canadians face today. The book is one of a series of Environmental Citizenship Primers.	1010 1090	2010	3010 3090 3120
SSC	*Fact Sheet: The Forest Tent Caterpillar.* Ottawa, ON: Canadian Forestry Service, 1975. Pamphlet.	1100		3110
CPPA	*Farming Canada's Forests: Forest Management and Silviculture.* Montreal, PQ: Canadian Pulp and Paper Association. Booklet.			3110
LRDC	*Fifty More Things You Can Do To Save The Earth.* Earthworks Group. Berkeley, CA: Andrews and McMeel, 1989.	1010 1100	2030	
CBE	*Fires & Stoves.* N. Kelba, et al. Calgary, AB: Calgary Board of Education, 1983. Booklet.	1040	2040	
EPPC	*First Harvest, The.* Edmonton, AB: Alberta Energy and Natural Resources. Pamphlet.	1010 1100		
ENED	*Focus On Series (Acidic Deposition, Air Quality, Environment, Greenhouse Effect, Land Reclamation, Ozone Depletion, Pesticides, Pollution, Recycling, Water Conservation).* Edmonton, AB: Alberta Environmental Protection, Education Branch. Booklets.	1090 1100	2030 2100	3010 3090
AFPA	*Forest Care: Codes of Practice.* Edmonton, AB: Alberta Forest Products Association. 1994. Pamphlet.		2100 2120	3110 3120

Other Resources (continued)

Distributor Code	Other Resources	Levels/Module No		
		1	2	3
FOCA	*Forest Explorers, The.* Canadian Council of Forest Ministers. Ottawa, ON: Forestry Canada. Booklet.	1010 1090 1100		
CCGP	*Forest Insect Pests in Canada.* Natural Resources Canada. Canada Communications Group, 1995. Over the past 10 years, insects have annually depleted one third of Canada's annual wood harvest. Forest specialists must apply new technologies, such as nonchemical pest control and biotechnology to limit the devastation caused by insect pests. Within the context of sustainable forest management, focus is on methods that are environmentally friendly and socially acceptable.	1090 1100	2100	3010 3090 3110
EPPC	*Forest Land Use Zones.* Edmonton, AB: Alberta Forestry, Lands and Wildlife. Pamphlet.		2010 2100 2120	3120
EPPC	*Forest Landscape Management Guidelines for Alberta.* Edmonton, AB: Alberta Forestry, Lands and Wildlife, 1986. Book.		2010 2100 2120	3120
AFPA	*Forest Line.* Edmonton, AB: Alberta Forest Products Association. Quarterly Newsletter.	1100	2030 2100	3010
SSC	*Forest Regions of Canada.* J.S. Rowe. Ottawa, ON: Canadian Forestry Service, Supply and Services Canada. 1977. Student Text.	1020		
DEF	*Forest, The: Understanding It, Using It, Keeping It.* Don Harris and Wendy Pobjoy. Charlottetown, PEI: Department of Energy and Forestry, 1991. Guidebook.	1010 1020 1090 1100	2070 2100	3070 3090
CFA	*Forestry on the Hill (Series: Clearcutting, Biodiversity and Monocultures, Herbicides, Forest Wildfires).* Ottawa, ON: Canadian Forestry Association. 1991–1993. Booklets.	1100	2070 2100	
EPPC	*Forests and Water.* Edmonton, AB: Alberta Energy and Natural Resources, 1985. Pamphlet.	1010 1090 1100		
EPPC	*Forests For The Future: Pine Ridge Forest Nursery.* Edmonton, AB: Alberta Forestry, Lands and Wildlife, 1986. Pamphlet.	1100	2100	3110

Other Resources (continued)

Distributor Code	Other Resources	Levels/Module No		
		1	2	3
EPPC	*Framework for Alberta's Special Places, A (Natural Regions Report No. 1).* Edmonton, AB: Alberta Parks Service. Booklet.	1020 1100	2030 2100	3120
CBE	*Freshwater Ecosystems.* N. Kelba, et al. Calgary, AB: Calgary Board of Education, 1992. Booklet.	1040 1090	2040	
CPPA	*From Watershed to Watermark.* Montreal, PQ: Canadian Pulp and Paper Association, 1987. Booklet.		2070	3070 3080
EPPC	*Genetics and Tree Improvement: Better Forests for the Future.* Edmonton, AB: Alberta Energy and Natural Resources, 1983. Booklet.			3110
ENED	*Guide to the Common Native Trees and Shrubs of Alberta.* W. Inkpen and R. Van Eyk. Alberta Environmental Protection, Education Branch. A guide designed to assist in the identification of the 29 most common woody plants found in Alberta. A minimal number of technical terms are used, and an illustrated glossary has been included to explain the botanical terms used. To aid identification, a written description of each tree and shrub is provided along with photographs and an illustrated line key based on leaf characteristics.	1010 1020 1040 1090	2040	3090
EPPC	*Grazing in the Green Area.* Edmonton, AB: Alberta Energy and Natural Resources, 1984. Pamphlet.		2010 2100 2120	3120
PBC	*Green Future: How To Make A World of Difference.* Lorraine Johnson. Markham, ON: Penguin Books, 1990. Textbook.	1100	2030 2100	3010
ACC	*Green Guide, The (Series I and II).* Edmonton, AB: ACCESS: The Education Station, 1991. Videos.		2030	3010
EPPC	*Green Tree Trailblazer Leader Manual.* Edmonton, AB: Alberta Provincial Advisory Council, Junior Forest Warden Association, 1992. Book.	1040 1090	2040	3110
EPPC	*Growing Opportunity, A: Alberta's Forest Resources.* Edmonton, AB: Alberta Forestry, Lands and Wildlife. Booklet.	1010 1100		
SSC	*Hinterland Who's Who (Series).* Ottawa, ON: Canadian Wildlife Service. Monographs.	1100	2100	

Other Resources (continued)

Distributor Code	Other Resources	Levels/Module No		
		1	2	3
OCV	*How Green Is Your School?* Don E. McAllister. Ottawa, ON: Ocean Voice, 1991. Booklet.	1100	2030 2100	3010
CBE	*Human Environments.* N. Kelba, et al. Calgary, AB: Calgary Board of Education, 1993. Teacher Resource Manual.	1040 1090 1100	2030 2040	
EPPC	*Industrial Land Disturbance and Reclamation in Forestry Areas.* Edmonton, AB: Alberta Forestry, Lands and Wildlife, 1992. Pamphlet.		2010 2100 2120	3120
CBE	*Kananaskis Country Environmental Education Teaching Activity Guide: Earth Science.* R. Lengsfeld, et al. Calgary, AB: Calgary Board of Education, 1987. Guidebook.	1040 1090	2040	
AFPA	*Key Issues Relating to the Alberta Forest Industry.* Edmonton, AB: Alberta Forest Products Association, 1992. Pamphlet.		2010 2100 2120	3120
ENED	*Land Conservation Education Program.* Edmonton, AB: Alberta Environmental Protection, Education Branch. Teacher's Guide and Student Materials.	1090 1100	2030 2100	3010 3090
FHW	*Mammals of the Northern Rockies.* Tom J. Ulrich. Missoula, MT: Mountain Press Publishing Company, 1990. Book.	1020 1040 1100	2040 2100	
FOCA	*Managing Your Woodland: A Non-Forester's Guide To Small-Scale Forestry in British Columbia.* Canadian Forestry Service. Ottawa, ON: Forestry Canada, 1988. Book.	1050 1060	2060 2070 2120	3060 3070 3110 3120
CCGP	*Manual of Pest Control, The.* (5th edition.) West, et al. Canadian Communication Group Publishing, 1983. This publication presents information on the life cycles and habits of pests and provides current advice on methods, equipment and material recommended for their control. A broader definition of the word "pest" has been adopted in this manual to include insects, animals and plants.		2100	3090 3110

Other Resources (continued)

Distributor Code	Other Resources	Levels/Module No		
		1	2	3
LPP	*Mosses Lichens & Ferns of Northwest North America: A Photographic Field Guide.* D. Vitt, et al. Lone Pine Publishing, 1988. Over 370 species of mosses, lichens, ferns and liverworts are fully described. The guide provides illustrations, systematic keys and notes on habitat, range and similar species.	1020 1040 1090	2040	
EPPC	*Native Trees of Alberta.* Edmonton, AB: Alberta Forestry, Lands and Wildlife. Pamphlet.	1020 1040 1090		
EPPC	*Natural Regions of Alberta: Poster Series.* Edmonton, AB: Alberta Environmental Protection, 1990. Posters and Manual.	1010 1020 1090		
CBE	*Navigation.* N. Kelba, et al. Calgary, AB: Calgary Board of Education, 1983. Booklet.	1040 1050		
CBE	*Nutrition.* N. Kelba, et al. Calgary, AB: Calgary Board of Education, 1983. Booklet.	1040	2040	
AFPA	*Our Growing Resource: Alberta's Forest Industry....Meeting Global Challenges.* Edmonton, AB: Alberta Forest Products Association, 1992. Booklet.		2060	3070 3080 3110
CTV	*Perils of Pulp.* Toronto, ON: CTV Television Network Ltd., 1992. Video.			3010
ENED	*Pesticide Education Program.* Edmonton, AB: Alberta Environmental Protection, Education Branch. Teacher's Guide and student materials.	1090 1100	2100	3090 3110
LPP	*Plants of the Western Boreal Forest and Aspen Parkland.* D. Johnson et al. Lone Pine Publishing, 1995. Detailed descriptions of common plants in the boreal forest and aspen parkland are combined with more than 900 colour photos and 900 line drawings. Provides species descriptions, historical uses, origin of names and colour photo keys.	1020 1090		3090 3110
EPPC	*Reforestation in Alberta.* Edmonton, AB: Alberta Forestry, Lands and Wildlife. Booklet.		2070	3110

Other Resources (continued)

Distributor Code	Other Resources	Levels/Module No		
		1	2	3
EPPC	*Resource Road Planning Guidelines*. Edmonton, AB: Alberta Energy and Natural Resources, 1985. Book.		2010 2100 2120	3120
EPPC	*Spruce Budworm Management*. Edmonton, AB: Alberta Forestry, Lands and Wildlife Forest Service, 1992. Pamphlet.	1100		3110
INEE	*Sunship Earth: An Acclimatization Program for Outdoor Learning*. Steve Van Matre. Calgary, AB: Institute for Earth Education, 1979. Book. Includes short (20-minute) concept path activities to acclimatize students for outdoor learning. Designed for students in grades 6-8.	1040	2010 2040	
FOCA	*Sustainable Forests: A Canadian Commitment*. Canadian Council of Forest Ministers. Ottawa, ON: Forestry Canada. 1992. Book.	1010 1020	2070 2100 2120	3010 3070 3080 3120
EPPC	*Timber Harvesting*. Edmonton, AB: Alberta Energy and Natural Resources, 1983. Pamphlet.		2070	
EPPC	*Timber Harvesting and the Environment*. Edmonton, AB: Alberta Forestry, Lands and Wildlife. Pamphlet.		2010 2100 2120	3120
EPPC	*Timber Quota Policy*. Edmonton, AB: Alberta Energy and Natural Resources, 1984. Book.		2010 2100 2120	3120
LLP	*Trees and Shrubs of Alberta: A Habitat Field Guide*. K. Wilkinson. Lone Pine Publishing, 1990. Clear, concise, nontechnical descriptions of Alberta's native and natural trees and shrubs are combined with 180 full-colour photos and line drawings. Includes habitat keys and distribution maps.	1010 1020 1030	2030	
FHW	*Trees in Canada*. J.L. Farrar. Fitzhenry & Whiteside Ltd., 1995. A comprehensive and well-researched text on native and introduced tree species found throughout Canada and the northern U.S. The text organizes more than 300 tree species into 12 groups based mainly on leaf shape and arrangement along the twig. Dichotomous keys for the groups and large general and winter keys for deciduous conifers and broad-leafed trees are also provided. Includes colour photos, line drawings and maps. This publication is intended to replace 'Native Trees of Canada'.	1010 1020 1040 1090	2040	3090

Other Resources (continued)

Distributor Code	Other Resources	Levels/Module No		
		1	2	3
ENED	*Water In Alberta: The Living Flow.* Edmonton, AB: Alberta Environmental Protection, Education Branch, 1993. Teacher Resource Kit.		2030 2060 2100	3010 3090
SSC	*What We Can Do For Our Environment: Hundreds of Things To Do Now.* (4th edition.) Hull, PQ: Environment Canada, Minister of Supply and Services, 1991. Booklet.	1100	2030 2110	3010

ADDITIONAL SOURCES

Available to Career and Technology Studies (CTS) teachers, locally and provincially, are many sources of information that can be used to enhance CTS. These sources are available through the community (e.g., libraries, boards, committees, clubs, associations) and through government agencies, resource centres and organizations. Some sources, e.g., government departments, undergo frequent name and/or telephone number changes. Please consult your telephone directory or an appropriate government directory.

The following is a partial list of sources to consider:

TEACHER–LIBRARIANS

Planned and purposeful use of library resources helps students grow in their ability to gather, process and share information. Research activities require access to an adequate quantity and variety of appropriate, up-to-date print and nonprint resources from the school library, other libraries, the community and additional sources. Some techniques to consider are:

- planning together
- establishing specific objectives
- integrating research skills into planning.

Cooperation between the teacher-librarian and the subject area teacher in the development of effectively planned resource-based research activities ensures that students are taught the research skills as well as the subject content. Also see *Focus on Research: A Guide to Developing Student's Research Skills* referenced in the Alberta Education resources section.

ALBERTA EDUCATION SOURCES

Alberta Government telephone numbers can be reached toll free from outside Edmonton by dialing 310–0000.

The following monographs are available for purchase from the Learning Resources Distributing Centre. Refer to the Distributor Directory at the end of this section for address, telephone, fax and Internet address.

Please consult the "Support Documents" section or the "Legal, Service and Information Publications" section in the LRDC *Buyers Guide* for ordering information and costs.

Developmental Framework Documents

- *The Emerging Student: Relationships Among the Cognitive, Social and Physical Domains of Development,* 1991 (Stock No. 161555)

  This document examines the child, or student, as a productive learner, integrating all the domains of development: cognitive, social and physical. It emphasizes the need for providing balanced curriculum and instruction.

- *Students' Interactions Developmental Framework: The Social Sphere,* 1988 (Stock No. 161399)

  This document examines children's perceptual, structural and motor development and how such physical development affects certain learning processes.

- *Students' Physical Growth: Developmental Framework Physical Dimension,* 1988 (Stock No. 161414)

  This document examines children's normal physical growth in three areas: perceptual, structural and motor development. In none of these areas is the child's growth in a single continuous curve throughout the first two decades of life. Physical growth is characterized by periods of rapid growth and periods of slower growth. Consequently, differences and changes in growth patterns may affect the timing of certain learning processes.

Other

- *Focus on Research: A Guide to Developing Students' Research Skills,* 1990 (Stock No. 161802)

  This document outlines a resource-based research model that helps students manage information effectively and efficiently, and gain skills that are transferable to school and work situations. This model provides a developmental approach to teaching students how to do research.

- *Teaching Thinking: Enhancing Learning,* 1990 (Stock No. 161521)

  Principles and guidelines for cultivating thinking, ECS to Grade 12, have been developed in this resource. It offers a definition of thinking, describes nine basic principles on which the suggested practices are based, and discusses possible procedures for implementation in schools and classrooms.

ACCESS: The Education Station

ACCESS: The Education Station offers a variety of resources and services to teachers. For a nominal dubbing and tape fee, teachers may have ACCESS: The Education Station audio and video library tapes copied. ACCESS: The Education Station publishes listings of audio and video cassettes as well as a comprehensive programming schedule.

Of particular interest are the CTS videos, which are available with utilization guides. The guides outline key points in each video and suggest questions for discussion, classroom projects and other activities. Video topics are listed in the Support Learning Resources section of this guide. The videos and accompanying support material can be obtained from ACCESS: The Education Station. Refer to the Distributor Directory at the end of this section for address, telephone, fax and Internet address.

GOVERNMENT SOURCES

National Film Board of Canada (NFB)

The NFB has numerous films and videotapes that may be suitable for Career and Technology Studies strands. For a list of NFB films and videotapes indexed by title, subject and director, or for purchase of NFB films and videotapes, call 1–800–267–7710 (toll free) or Internet address: http://www.nfb.ca

ACCESS: The Education Station and some school boards have acquired duplication rights to some NFB videotapes. Please contact ACCESS: The Education Station or consult the relevant catalogues in your school or school district.

The Edmonton Public Library and the Calgary Public Library have a selection of NFB films and videotapes that can be borrowed free of charge with a Public Library borrower's card. For further information, contact:

Edmonton Public Library
Telephone: 403–496–7000

Calgary Public Library
Telephone: 403–260–2650

For further information contact:

Statistics Canada
Regional Office
8th Floor, Park Square
10001 Bellamy Hill
Edmonton, AB T5J 3B6
Telephone: 403–495–3027
Fax: 403–495–5318
Internet address: http://www.statcan.ca

Statistics Canada produces periodicals, reports, and an annual year book.

Resource Centres

Urban Resource Centres

Instructional Services
Elk Island Public Schools
2001 Sherwood Drive
Sherwood Park, AB T8A 3W7
Telephone: 403–464–8235
Fax: 403–464-8033
Internet Address: http://ei.educ.ab.ca

Learning Resources Centre
Red Deer Public School Board
4747 – 53 Street
Red Deer, AB T4N 2E6
Telephone: 403–343–8896
Fax: 403–347–8190

Instructional Materials Centre
Calgary Separate School Board
6220 Lakeview Drive SW
Galgary, AB T3E 5T1
Telephone: 403–298–1679
Fax: 403–249–3054

School, Student, Parent Services Unit
Program and Professional Support Services Sub Unit
Calgary Board of Education
3610 – 9 Street SE
Calgary, AB T2G 3C5
Telephone: 403–294–8542
Fax: 403–287–9739

After July 1, 1997, please contact the School, Student, Parent Services Unit regarding the relocation of the Loan Pool Resource Unit.

Learning Resources
Edmonton Public School Board
Centre for Education
One Kingsway Avenue
Edmonton, AB T5H 4G9
Telephone: 403–429–8387
Fax: 403–429–0625

Instructional Materials Centre
Medicine Hat School District No. 76
601 – 1 Avenue SW
Medicine Hat, AB T1A 4Y7
Telephone: 403–528–6719
Fax: 403–529–5339

Resource Centre
Edmonton Catholic Schools
St. Anthony's Teacher Centre
10425 – 84 Avenue
Edmonton, AB T6E 2H3
Telephone: 403–439–7356
Fax: 403–433–0181

Instructional Media Centre
Northern Lights School Division No. 69
Bonnyville Centralized High School
4908 – 49 Avenue
Bonnyville, AB T9N 2J7
Telephone: 403–826–3366
Fax: 403–826–2959

Regional Resource Centres

Zone 1

Zone One Regional Resource Centre
P.O. Box 6536
10020 – 101 Street
Peace River, AB T8S 1S3
Telephone: 403–624–3187
Fax: 403–624–5941

Zone 2/3

Central Alberta Media Services (CAMS)
182 Sioux Road
Sherwood Park, AB T8A 3X5
Telephone: 403–464–5540
Fax: 403–449–5326

Zone 4

Information and Development Services
Parkland Regional Library
5404 – 56 Avenue
Lacombe, AB T4L 1G1
Telephone: 403–782–3850
Fax: 403–782–4650
Internet Address: http://rtt.ab.ca.rtt/prl/prl.htm

Zone 5

South Central Alberta Resource Centre (SCARC)
Golden Hills Regional Division
435A Hwy 1
Westmount School
Strathmore, AB T0J 3H0
Telephone: 403–934–5028
Fax: 403–934–5125

Zone 6

Southern Alberta Learning Resource Centre (SALRC)
Provincial Government Administration Building
909 Third Avenue North, Room No. 120
Box 845
Lethbridge, AB T1J 3Z8
Telephone: 403–320–7807
Fax: 403–320–7817

OTHER GOVERNMENT SOURCES

Alberta Advanced Education and Career Development
Information Development and Marketing
9th Floor, City Centre Building
10155 – 102 Street
Edmonton, AB T5J 4L5
Telephone: 403–422–1794
Fax: 403–422–5319
E-mail: careerinfo@aecd.gov.ab.ca

Alberta Careers Beyond 2000
Alberta Careers Beyond 2000: Industry Sector Profiles
Alberta Careers Beyond 2000: Occupational Profiles.

Videos on career planning and entrepreneurial topics are available through the library of this department. Call 403–422–4752 for more information. The following videos are representative of the library's holdings:

The Entrepreneur
Get a Job
A Head for Business
The Seven Phases of a Job Interview.

Alberta Agriculture, Food and Rural Development

Website: www.agric.gov.ab.ca

Publications
7000 – 113 Street
Edmonton, AB T6H 5T6
Telephone: 403–427–2121
Fax: 403–427–2861

Publications List (a comprehensive listing of free and inexpensive print materials on a variety of topics in agriculture; updated each year).

Multi-Media Branch
7000 – 113 Street
Edmonton, AB T6H 5T6
Telephone: 403–427-2127
1-800-292-5697
Fax: 403–427–2861

Audio Visual Catalogue (an annotated listing of films and videos available for loan upon request; updated each year).

4-H Branch
2nd Floor, 7000 - 113 Street
Edmonton, AB T6H 5T6
Telephone: 403–427-2412
Fax: 403–422-7755

4-H Project Materials

Crop Diversification Centre North
(formerly Alberta Tree Nursery and Horticulture Centre)
R.R. #6, 17507 Fort Road
Edmonton, AB T5B 4K3
Telephone: 403–422–1789
Fax: 403–422–6096

Crop Diversification Centre South
(formerly Alberta Special Crop and Horticulture Research Centre)
S.S. 4
Brooks, AB T1R 1E6
Telephone: 403–362-1300
Fax: 403–362-1306

Alberta Environmental Protection
Website: www.gov.ab.ca/~env/index.hmtl
Strategic and Regional Support
Education Branch
(handles inquiries formerly directed to the Environmental Council of Alberta)
11th Floor, South Petroleum Plaza
9915 - 108 Street
Edmonton, AB T5K 2G8
Telephone: 403–427–6310
Fax: 403–422-5136
E-mail: envedu@env.gov.ab.ca

Land Conservation Education Program
Pesticide Education Program
The Water Literacy Program
Focus On Series
Poster Education Series
(Workshops and presentations on these program materials can be arranged.)

Communications Division
9th Floor, Petroleum Plaza, South Tower
9915 - 108 Street
Edmonton, Alberta T5K 2G8
Telephone: 403–427-8636
Fax: 403–422-6339

EP LINK (a newsletter about projects, programs and activities undertaken by Alberta Environmental Protection staff)

Edmonton District Fish and Wildlife Office
(handles inquiries regarding all Conservation Education Programs)
14515 - 122 Avenue
Edmonton, AB T5L 2W4
Telephone: 403–422-2605
Fax: 403–427-5695

Project Wild
Alberta Conservation and Hunter Education Program
Alberta Fishing Education Program

Provincial Film Library
(handles the booking and distribution of Conservation Education films and videos)
2nd Floor, 11510 Kingsway Avenue
Edmonton, AB T5G 2Y5
Telephone: 403–427-4381
Fax: 403–452-0668

Natural Resources Service
(handles inquiries formerly directed to Fish & Wildlife Services)
Information Centre
9920 – 108 Street
Edmonton, AB T5K 2M4
Telephone: 403–944–0313

Land and Forest Services
9920 – 108 Street
10th Floor, Bramalea Building
Edmonton, AB T5K 2M4
Telephone: 403–427–8474
Fax: 403–427–0292

Junior Forest Wardens Program

Recreation and Protected Areas Division
(handles inquires formerly directed to Alberta Parks)
2nd Floor Oxbridge Place
9820-106 Street
Edmonton, AB T5K 2J6
Telephone: 403–427–6781
Fax: 403–427–5980

Alberta Justice
Chief Provincial Firearms Office
Ground Floor, 10365 – 97 Street
Edmonton, AB T5J 3W5
Telephone: 403–427–0437
Fax: 403–427–1100

Canadian Firearms Safety Course

Canadian Heritage, Parks Canada
(handles inquiries formerly directed to Parks Canada)
Website (for Canada's Environmental Report):
http://199.212.18.12/folio.pgi/soe
Telephone: 1-800-748-7275
E-mail: NATLPARKS-AB@PCH.GC.CA

Calgary Office:
552, 220 – 4th Avenue SE
Calgary, AB T2G 4X3

Edmonton Office:
220 Canada Place
9700 Jasper Avenue
Edmonton, Alberta T5J 4C3

Environment Canada
Inquiry Centre
351 St. Joseph Blvd.
Hull, PQ K1A 0H3
Telephone: 819–997–2800
Fax: 613–953–2225

Action 21
27th Floor, #10 Wellington Street
Hull, PQ K1A 0H3
Telephone: 1-800-668-6767

Environmental Citizenship Series:
A Primer on Environmental Citizenship
The Nature of Canada: A Primer on Spaces and Species
A Primer on Climate Change
A Primer on Water

Communications Division
Environmental Conservation Branch
Western & Northern Region
(handles inquiries formerly directed to the Canadian Wildlife Service)
200, 4999 – 98 Avenue
Edmonton, AB T6B 2X3
Telephone: 403–951–8720
Fax: 403–495–2615

Wildlife & environmental publications

Industry Canada
(handles inquiries formerly directed to Industry & Science Canada)

Website: http://strategis.ic.gc.ca

Northern Region
540 Canada Place
9700 Jasper Avenue
Edmonton, AB T5J 4C3
Telephone: 403–495-4782

Or

Southern Region
#400, 639 - 5th Avenue SW
Calgary, AB T2P 0M9
Telephone: 403–292-4575

Natural Resources Canada

Website: *www.nrcan.gc.ca*

Canadian Forestry Service
(handles inquiries formerly directed to Forestry Canada & Northern Forestry Research Centre)

Websites: *www.nrcan.gc.ca/cfs*
www.nofc.forestry.ca

5320 - 122 Street
Edmonton, Alberta T6H 3S5
Telephone: 403–435-7210
Fax: 403–435-7359
E-mail: @nofc.forestry.ca

Distribution Section
Communications NRCan
580 Booth Street, 20th Floor
Ottawa, ON K1A 0E4
Telephone: 616–992–0759 / 616–995-6783
Fax: 616–996–9094

(A Publications List is available upon request.)

PROFESSIONAL ASSOCIATIONS

ATEC
12th Floor, Sterling Place
9940 – 106 Street
Edmonton, AB T5K 2N2
Telephone: 403–422–0781
Fax: 403–422–3430

- Resources previously available through ATEC may now be available from Training Resource Centre, Grant MacEwan Community College.

Occupational Standards for:
Freshwater Angling Guide
Outdoor Guide
Hunting Guide

Alberta Forest Technologists Association
5320 - 122 Street
Edmonton, AB T6H 3S5
Telephone: 403–432-1962
Fax: 403–432-7046

Alberta Land Surveyors Association
2501 CN Tower
10004 - 104 Avenue
Edmonton, AB T5J 0K1
Telephone: 403–429-3374
1-800-665-2572

Alberta Registered Professional Foresters Association
Website: www.nofc.forestry.ca/arpfa
5320 - 122 Street
Edmonton, AB T6H 3S5
Telephone: 403–432-1177
Fax: 403–432-7046
E-mail: arpfa@nofc.forestry.ca

Alberta Society of Professional Biologists
Website: www.ccinet.ab.ca/aspb
#2 - 9804 - 47th Avenue
Edmonton, AB T6E 5P3
Telephone: 403–434-5765
Fax: 403–435-7503
E-mail: aspb@ccinet.ab.ca

Alberta Teachers' Association
Website: www.teachers.ab.ca
Barnett House
11010 – 142 Street
Edmonton, AB T5N 2R1
Telephone: 403–453–2411
1–800–232–7208
Fax: 403–455-6481

CTS Council
Environmental and Outdoor Education Council
Alberta Global Education Project
Science Council

Association of Canada Land Surveyors
Box 5378
Station Merivale #120
162 Cleopatra Drive
Nepean, ON K2G 5X2
Telephone: 613–723-9200
Fax: 613–224-9577
E-mail: aclsaatc@magi.com

Canadian Association of Plant Physiologists
Website: under construction
c/o Department of Botany
University of Guelph
Guelph, ON N1G 2W1
Telephone: 519–824-4120
Fax: 519–767-1991

INDUSTRY ORGANIZATIONS

Alberta Forest Products Association
Website: www.abforestprod.org
11738 Kingsway Avenue
Edmonton, AB T5G 0X5
Telephone: 403–452–2841
Fax: 403–455–0505

Our Growing Resource: Alberta's Forest Industry…Meeting Global Challenges
ForestLine (a quarterly publication that informs AFPA members and the public about Alberta forest industry news, events and people)
AFPA Membership Directory (provides listings of lumber, secondary manufacturing, and pulp and paper industries and organizations).

Alberta Logging Association
10916 – 97 Avenue
Grande Prairie, AB T8V 3J8
Telephone: 403–538-2950

Industrial Vegetation Management Association of Alberta
Suite 410, 2424 - 4th Avenue SW
Calgary, AB T2S 2T4
Telephone: 403–541-9600
Fax: 403–244-4621

OFF CAMPUS FACILITIES

The following facilities may offer opportunities for observation and/or practical experience in aspects of resource management and environmental education. Contact the facility for information regarding programs offered to school groups.

Environmental Training Centre
(formerly the Forest Technology School)

Website:
www.gov.ab.ca/env/cms/hrd/etc/etc.html

Alberta Forest Service Museum
1176 Switzer Drive
Hinton, AB T7V 1V3
Telephone: 403–865–8200
Fax: 403–865-8266
E-mail: envtrain@env.gov.ab.ca

Cache Percotte Environmental Training Centre
1176 Switzer Drive
Hinton, AB T7V 1V3
Telephone: 403–865-8234 (information)
Telephone: 403–865-8200 (bookings)

(Provides programs that develop awareness, appreciation, respect and responsible use of the natural environment as well as outdoor recreation skills. Through partnerships with the Alberta Forest Products Association, the centre also provides programs on responsible forest management practices in Alberta.)

Bennett Environmental Education Centre

Website:
www.
epsb.edmonton.ab.ca/services/bennettc

Edmonton Public Schools
9703 – 94 Street
Edmonton, AB T6C 3W1
Telephone: 403–468–1439
1-800-664-6630
Fax: 403–466-3370
E-mail: bennettc@epsb.edmonton.ab.ca

Calgary Zoo

Website: www.calagaryzoo.ab.ca

Botanical Gardens and Prehistoric Park
P.O. Box 3036, Station "B"
Calgary, AB T2M 4R8
Telephone: 403–232-9386 (program bookings)
E-mail: through website

Environmental Resource Centre

Website: www.dc.ab.ca

10511 Saskatchewan Drive
Edmonton, AB T6E 4S1
Telephone: 403–433–8711
Fax: 403–439-5081
E-mail: dc@ccinet.ab.ca

Kananaskis Field Station

Website:
www.ucalgary.ca/~biology/kananaskis

Coordinator of School Programs
Bio Sciences 186
University of Calgary
2500 University Drive NW
Calgary, AB T2N 1N4
Telephone: 403–220–5355
Fax: 403–673–3671
E-mail: mmappin@acs.ucalgary.ca

CONSERVATION EDUCATION CAMPS

Alford Lake Conservation Education Centre
Box 369
Caroline, AB T0M 0M0
Telephone: 403–722-2423
Fax: 403–722-2423

Crowsnest Portable Camp
1440 - 17A Street SE
Calgary, AB T2G 4T9
Telephone: 403–297-2838
Fax: 403–297-2839

447

Narrow Lake Conservation Education Centre
14515 - 122 Avenue
Edmonton, Alberta T5L 2W4
Telephone: 403-422-2606
Fax: 403-427-5695

FISH HATCHERIES / BROOD STATIONS

Cold Lake Fish Hatchery
Box 8159
Cold Lake, AB T0A 0V0
Telephone: 403-639-4087
Fax: 403-639-3598

Raven Brood Trout Station
Box 160
Caroline, AB T0M 0M0
Telephone: 403-722-2180
Fax: 403-722-3784

Sam Livingston Fish Hatcheries
1440 - 17A Street SE
Calgary, AB T2G 4T9
Telephone: 403-297-6561

OTHER AGENCIES

Alberta Forestry Association
101, 10526 Jasper Avenue
Edmonton, AB T5J 1Z7
Telephone: 403-428-7582
Fax: 403-428-7557

Forest Resources Directory
Alberta's Focus on Forests
Woodlot Management Information Series
Woodlot Management Guide for the Prairie Provinces

Alberta Safety Council
201, 10526 Jasper Avenue
Edmonton, AB T5J 1Z7
Telephone: 403-428-7555
1-800-301-6407
Fax: 403-428-7557

(Provides a range of occupational health and safety training programs endorsed by industry partners.)

Alberta Science and Technology Hotline

Website: www.cadvision.com/calg_sci_net

Peace River Hotline, Northwest Alberta
Telephone: 403-539-9847
Fax: 403-539-0522

Northeast Alberta, including Edmonton and Red Deer Regions:
Telephone: 403-448-0055
Fax: 403-453-2711

Calgary Region
Telephone: 403-263-6226
Fax: 403-230-8488
E-mail: scihot@cadvision.com

Praxis Hotline, Medicine Hat Region
Telephone: 403-526-4237

(The *Alberta Science and Technology Hotline* provides teachers with a direct line to the science community to access information and expertise.)

Alberta Wilderness Association
PO Box 6398, Stn. D
Calgary, AB T2P 2E1
Telephone: 403-283-2025
Fax: 403-270-2743
E-mail: awa@web.net

Canadian Forestry Association
185 Somerset Street West, Suite 203
Ottawa, ON K2P 0J2
Telephone: 613-232-1815
Fax: 613-232-4210

National Forest Education Resources Catalogue

Canadian Foundation for Economic Education
501, # 2 St. Clair Avenue West
Toronto, ON M4V 1L5
Telephone: 416-968-2236
Fax: 416-968-0488

Environomics: Exploring links between the economy and the environment
Entrepreneurship: A Primer for Canadians
Labour Market: Teacher's Resource Package

Canadian Nature Federation
Website: www.web.net/~cnf
1 Nicholas Street, Suite 520
Ottawa, ON K1N 7B7
Telephone: 613–62-3447
Fax: 613–562-3371
E-mail: cnf@web.net

Canadian Parks and Wilderness Society
Website:
www.afternet.com/~tnr/cpaws/cpaws.html
401 Richmond St W
Toronto, ON M5V 3A8
Telephone: 416–972–2720
Fax: 416–979-3155
E-mail: cpaws@web.net

Canadian Wildlife Federation
Website: www.toucan.net/cwf-fcf/cwfhome.html
2740 Queensview Drive
Ottawa, ON K2B 1A2
Telephone: 613–721-2286
1–800–563–9453
Fax: 613–721–2902
E-mail: info@cwf-fcf.org

FEESA
Website: www.telusplanet.net/public/feesa
900, 10150 - 100 Street
Edmonton, AB T5J 0P6
Telephone: 403–421–1497
Fax: 403–425–4506
E-mail: feesa@telusplanet.net

FEESA offers education training and resource materials focusing on a variety of environmental and educational needs. Programs are developed in partnership with business, industry, government, environmental and education groups.

Green Teacher
Website: www.web.ca/~greentea/
95 Robert Street
Toronto, ON M5S 2K5
Telephone: 416–960–1244
Fax: 416–925–3474
E-mail: greentea@web.ca

A magazine by and for educators to enhance environmental and global education across the curriculum.

The Pembina Institute for Appropriate Development
Website: www.dvnet.drayton-valley.ab.ca/environ.pembina.htm
P.O. Box 7558
Drayton Valley, AB T7A 1S7
Telephone: 403–542–6272
Fax: 403–542–6464
E-mail: piad@ccinet.ab.ca

The Canadian Environmental Education Catalogue

RADARSAT International
Website: www.rsi.ca
Client Services
3851 Shell Road, Suite 200
Richmond, BC V6X 2W2
Telephone: 604–244–0400
Fax: 604–244–0404
E-mail: info@rsi.ca

Provides a range of information, products and services relevant to applications of remote radar satellite sensing technology in gathering environmental and resource data.

The Science Alberta Foundation
2100, 700 - 6th Avenue SW
Calgary, AB T2P 0T8
Telephone: 403–260–1996
Fax: 403–260–1165
E-mail: litebulb@supernet.ab.ca

The Science Alberta Foundation promotes science literacy throughout the province. Their programs are hands-on, and include travelling exhibitions and professional development courses.

Recycle Infoline
(handles inquires previously directed to the Alberta Special Waste Management Corporation)
12th floor South Petroleum Plaza
9915 - 108 Street
Edmonton, AB T5K 2G8
Telephone: 1-800-463-6326
Fax: 403-427-0413

Provides information regarding environmental and hazardous wastes.

Red Cross Society
Website: www.redcross.ca
737 - 13 Avenue SW
Calgary, AB T2R 1J1
Telephone: 403-541-4445
Fax: 403-541-4428

Emergency First Aid
Standard First Aid
Basic Rescuer CPR

Safety Care Incorporated
Website: www.safetycare.com.au
3354 Tennyson Avenue
Victoria, BC V8Z 3P6
Telephone: 250-475-6775
Fax: 250-475-6705

Videos:
Safe Operation of a Chainsaw
Chainsaw Maintenance and Safety

The SEEDS Foundation
440, 10169 – 104 Street
Edmonton, AB T5J 1A5
Telephone: 403-424-0971
Fax: 403-424-2444

St. John Ambulance
Provincial Headquarters
10975 – 124 Street
Edmonton, AB T5M 0H9
Telephone: 403-452-6565
Fax: 403-452-2835

Emergency First Aid
Standard First Aid
Basic Rescuer CPR
First Aid in the Wilderness

W.I.S.E. Foundation
1440 - 17A Street SE
Calgary, AB T2G 4T9
Telephone: 403-297-2838

World Wildlife Fund Canada
Website: www.wwfcanada.org
#504, 90 Eglinton Avenue E
Toronto, ON M4P 2Z7
Telephone: 416-489-8800
1-800-267-2632
Fax: 416-489-3611 (or 8055)
E-mail: panda@wwfcanada.org

ADDITIONAL WEBSITES OF NOTE

Alberta Forest and Building Products
http://www.gov.ab.ca/dept/edt/export/forest.html

Canadian Biodiversity Information Network
http://www.doe.ca/ecs/biodiv/bioCiv.html

EcoNet
http://www.igc.apc.org/forest

Mitsubishi Corporation
http://mcweb.mitsubishi.co.jp/

State of Canada's Forests
http://ncr157.ncr.forestry.ca/sof/sof.html

Western Canada Wilderness Committee
http://www.ccinet.ab.ca/wcwc/

DISTRIBUTOR DIRECTORY

The entries in the Distributor Directory are arranged alphabetically by code.

CODE	Distributor/Address	Contact Via
ACC	ACCESS: The Education Station 3270 – 76 Avenue Edmonton, AB T6B 2N9	403–440–7777 Fax: 403–440–8899 1–800–352–8293 http://www.ccinet.ab.ca/access
AFA	Alberta Forestry Association #101 Alberta Block 10526 Jasper Avenue T5J 1Z7	403–428–7582 Fax: 403–428–7557
AFPA	Alberta Forest Products Association 200, 11738 Kingsway Avenue Edmonton, AB T5G 0X5	403–452–2841 Or, 403–452–2673 Fax: 403–455–0505
ACP	Amoco Canada Petroleum Company Ltd. 240 – 4th Avenue SW Calgary, AB T2P 2H8	403–233–1425 Fax: 403–233–1476
CBE	Calgary Board of Education Education Centre Building 515 Macleod Trail SE Calgary, AB T2G 2L9	403–294–8211 Fax: 403–294–8336
CCGP	Canada Communication Group Publishing Government of Canada 45 Sacre-Coeur Blvd. Room D2200 HULL, QC K1A 0S9	819–956–4800 819–956–1620 Fax: 819–994–1498
CCP	Copp Clark Longman Ltd. See LRDC *Buyers Guide* for Information	
CFA	Canadian Forestry Association 203, 185 Somerset Street West Ottawa, ON K2J 4E5	613–232–1815 Fax: 613–232–4210
CPPA	Canadian Pulp and Paper Association 23rd Floor, Sun Life Building 1155 Metcalfe Street Montreal, QC H3B 2X9	514–866–6621

Distributor Directory (Continued)

CODE	Distributor/Address	Contact Via
CTV	CTV Program & Archive Sales Suite 1800, 250 Yonge Street Toronto, ON M5B 2N8	416–595–4463 Fax: 416–595–0917
DEF	Prince Edward Island Department of Energy and Forestry Forestry Branch P.O. Box 2000 Charlottetown, Prince Edward Island C1A 7N8	902–368–4700 Fax: 902–368–5544
ENCA	Environment Canada Terrasses de la Chaudiere 27th Floor, 10 Wellington Street Hull, Quebec K1A 0H3	819–953–1595 Fax: 819–994–1412 1–800–668–6767
ENED	Alberta Environmental Protection, Education Branch 11th Floor, South Petroleum Plaza 9915 – 108 Street Edmonton, AB T5K 2G8	403–427–6310 Fax: 403–422–5136
EPPC	Environmental Protection Information Centre Main Floor 9920 – 108 Street Edmonton, AB T5K 2M4	403–422–2079 Fax: 403–427–4407
FEESA	FEESA, An Environmental Education Society #900, 10150 – 100 Street Edmonton, AB T5J 0P6	403–421–1497 Fax: 403–425–4506
FOCA	Canadian Forestry Service 5320 – 122 Street Edmonton, AB T6H 3S5	403–435–7210 Fax: 403–435–7359
FHW	Fitzhenry & Whiteside Ltd. See LRDC *Buyers Guide* for information	
INEE	The Institute for Earth Education Publications Services P.O. Box 880, Station "G" Calgary, AB T3A 2G6	403–246–6611

Distributor Directory (Continued)

CODE	Distributor/Address	Contact Via
LPP	Lone Pine Publishing 206, 10426 – 81 Avenue Edmonton, AB T6E 1X5	403–433–9333 1–800–661–9017 Fax: 403–433–9646
LRDC	Learning Resources Distributing Centre 12360 – 142 Street Edmonton, AB T5L 4X9	403–427–5775 Fax: 403–422–9750 http://ednet.edc.gov.ab.ca/lrdc
NDM	New Dimensions Media Inc. 85803 Lorane Highway Eugene, OR USA 97405	503–484–7125 Fax: 503–484–5267
OCV	Ocean Voice 2883 Otterson Drive Ottawa, ON K1V 7B2	613–996–9915
PBC	Penguin Books Canada Ltd. 1220 Nicholson Road Newmarket, ON L3Y 7V1	905–836–6730 Fax: 905–836–6729 1–800–668–6540
TRC	Training Resource Centre Grant MacEwan Community College City Centre Campus Room 5–309, 10700 – 104 Avenue Edmonton, AB T5J 4S2 • Memberships must be purchased.	403–497–5475 Fax: 403–497–5677

FORESTRY

SECTION J: SAMPLE STUDENT LEARNING GUIDES

The following pages provide background information, strategies and a template for developing student learning guides. Also included at the end of this section are several sample student learning guides for Forestry.

A student learning guide provides information and direction to help students attain the expectations defined in a specified CTS module. It is designed to be used by students under the direction of a teacher.

Many excellent student learning guides (SLGs) are available for use and/or are in the process of being developed. While Alberta Education provides a development template accompanied by some samples, most student learning guide development is being done by individuals and organizations across the province (e.g., school jurisdictions, specialist councils, post-secondary organizations). Refer to the *Career & Technology Studies Manual for Administrators, Counsellors and Teachers* (Appendix 11) for further information regarding student learning guide developers and sources.

Note: A student learning guide is not a self-contained learning package (e.g., Distance Learning Module), such as you might receive from the Alberta Distance Learning Centre (ADLC) or Distance Learning Options South (DLOS).

TABLE OF CONTENTS

BACKGROUND INFORMATION J.3
- Components of a Student Learning Guide J.3
- Strategies for Developing Student Learning Guides J.4

SAMPLE STUDENT LEARNING GUIDE TEMPLATE J.5

SAMPLE STUDENT LEARNING GUIDES

- FOR1020 Forest Regions of Canada J.11
- FOR1040 Woods Survival 1 .... J.17
- FOR1090 Forest Ecology 1 .... J.23

BACKGROUND INFORMATION

A Student Learning Guide (SLG) is a presentation of information and direction that will help students attain the expectations defined in a specified CTS module. It is designed to be used by students under the direction of a teacher. A SLG is not a self-contained learning package such as you might receive from the Alberta Distance Learning Centre (ADLC) or Distance Learning Options South (DLOS).

Each SLG is based on curriculum and assessment standards as defined for a particular CTS module. Curriculum and assessment standards are defined in this document through:

- module and specific learner expectations (Sections D, E and F)
- assessment criteria and conditions (Sections D, E and F)
- assessment tools (Section G).

The SLG is written with the student in mind and makes sense to the student in the context of his or her CTS program. SLGs are designed to guide students through modules under the direction of the teacher. They can be used to guide:

- an entire class
- a small groups of students
- individual students.

In some instances, the Student Learning Guide may also be used as teacher lesson plans. When using SLGs as teacher lesson plans, it should be noted that they tend to be:

- learner-centred (versus teacher-directed)
- activity-based (versus lecture-based)
- resource-based (versus textbook-based).

Components of a Student Learning Guide

The student learning guide format, as developed by Alberta Education, typically has *seven* components as described below.

1. *Why Take This Module?*

   This section provides a brief rationale for the work the student will do, and also establishes a context for learning (i.e., in relation to the strand, a life pursuit, a specific industry, etc.).

2. *What Do You Need To Know Before You Start?*

   In this section, prerequisite knowledge, skills and attitudes considered necessary for success in the module are identified. Prerequisites may include other modules from within the strand or from related CTS strands, as well as generic knowledge and skills (e.g., safety competencies, the ability to measure/write/draw, prior knowledge of basic information relevant to the area of study).

3. *What Will You Know And Be Able To Do When You Finish?*

   This information must parallel and reflect the curriculum and assessment standards as defined for the module. You may find it desirable to rewrite these standards in less formal language for student use.

4. *When Should Your Work Be Done?*

   This section provides a timeline that will guide the student in planning their work. The timeline will need to reflect your program and be specific to the assignments you give your students. You may wish to include a time management chart, a list of all assignments to be completed, and instructions to the student regarding the use of a daily planner (i.e., agenda book) to organize their work.

5. *How Will Your Mark For This Module Be Determined?*

   This section will interpret the assessment criteria and conditions, assessment standards, assessment tools and suggested emphasis as defined for the module within the context of the projects/tasks completed. Accepted grading practices will then be used to determine a percentage grade for the module—a mark not less than 50% for successful completion. (**Note**: A module is "successfully completed" when the student can demonstrate ALL of the exit-level competencies or MLEs defined for the module.)

6. *Which Resources May You Use?*

   Resources considered appropriate for completing the module and learning activities are identified in this section of the guide. The resources may be available through the Learning Resources Distributing Centre (LRDC) and/or through other agencies. Some SLGs may reference a single resource, while others may reference a range of resources. Resources may include those identified in the Learning Resource Guide (Section I) as well as other sources of information considered appropriate.

7. *Activities/Worksheets*

   This section provides student-centred and activity-based projects and assignments that support the module learner expectations. When appropriately aligned with curriculum and assessment standards, successful completion of the projects and assignments will also indicate successful completion of the module.

Strategies for Developing Student Learning Guides

Prior to commencing the development of a student learning guide, teachers are advised to obtain:

- the relevant Guide to Standards and Implementation
- the student learning guide template.

Information communicated to the student in the SLG must parallel and reflect the curriculum and assessment standards as defined for the module. Therefore, critical elements of the Guide to Standards and Implementation that need to be addressed throughout the SLG include:

- module and specific learner expectations
- assessment criteria and conditions
- assessment standards
- assessment tools.

Additional ideas and activities will need to be incorporated into the student learning guide. These can be obtained by:

- reflecting on projects and assignments you have used in delivering programs in the past
- identifying human and physical resources available within the school and community
- networking and exchanging ideas (including SLGs) with other teachers
- reviewing the range of resources (e.g., print, media, software) identified in the Learning Resource Guide (Section I) for a particular module/strand.

Copyright law must also be adhered to when preparing a SLG. Further information and guidelines regarding copyright law can be obtained by referring to the:

- *Copyright Act*
- *Copyright* and the *Can Copy Agreement*.

A final task in developing a student learning guide involves validating the level of difficulty/challenge/rigour established, and making adjustments as considered appropriate.

A template for developing student learning guides, also available on the Internet, is provided in this section (see "Student Learning Guide Template," pages J.5–10). Several sample student learning guides are also provided in this section (see "Sample Student Learning Guides," starting on page J.11.

456

CAREER &
TECHNOLOGY
STUDIES

SAMPLE STUDENT LEARNING GUIDE TEMPLATE

WHY TAKE THIS MODULE?

WHAT DO YOU NEED TO KNOW BEFORE YOU START?

WHAT WILL YOU KNOW AND BE ABLE TO DO WHEN YOU FINISH?

•
•
•
•
•
•
•
•

WHEN SHOULD YOUR WORK BE DONE?

12
1
2
3
4
5
6
7
8
9
10
11

HOW WILL YOUR MARK FOR THIS MODULE BE DETERMINED?

	PERCENTAGE

WHICH RESOURCES MAY YOU USE?

•

•

•

•

•

•

ACTIVITIES/WORKSHEETS

461

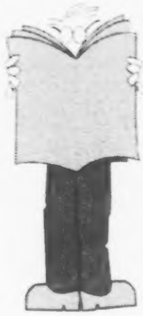
CAREER & TECHNOLOGY STUDIES

FORESTRY

SAMPLE STUDENT LEARNING GUIDE

FOR1020 Forest Regions of Canada

WHY TAKE THIS MODULE?



- A fundamental requirement for anyone working in the forest is to be able to identify the types of vegetation present. This often gives clues as to the location and climate of the area. FOR1020 is an introduction to dendrology, the study of trees. This is a module for students interested in being able to identify local tree species and to explain the reasons for the locations of the forest regions of Canada and Alberta.
- This course should be taken in the late spring or early in the fall to make it much easier to identify trees by their leaves rather than the bare twigs in winter.

WHAT DO YOU NEED TO KNOW BEFORE YOU START?

There are no prerequisites identified for this module.

However, you should be able to:

- locate and describe the geographic regions of Canada
- use and understand maps
- apply the scientific method of inquiry.

WHAT WILL YOU KNOW AND BE ABLE TO DO WHEN YOU FINISH?

Upon completion of this module you will be able to:

- identify factors that determine the type and distribution of forests
- locate and describe the forest regions of Canada
- identify and describe trees that grow in specific regions of Canada and Alberta
- demonstrate basic competencies.

WHEN SHOULD YOUR WORK BE DONE?

Your teacher will give you a timeline for completing tasks and assignments within this module.

You may also wish to use a time-management planning chart to preplan the work that needs to be done in this module. Plan how you will use your class time as well as extra time needed to complete the assignments in this module.

12
1
2
3
4
5
6
7
8
9
10
11

HOW WILL YOUR MARK FOR THIS MODULE BE DETERMINED?

	PERCENTAGE
You must first demonstrate **all** of the competencies required for this module.	
When you have done this, your percentage mark for the module will be determined as follows:	
• Moisture Lab	10%
• Test on Factors	10%
• Forest Region Maps (Canada)	25%
(Alberta)	15%
Leaf Collection	40%

WHICH RESOURCES MAY YOU USE?

- *Trees and Shrubs of Alberta*
- *Native Trees of Canada*
- *Flora of Alberta*
- *Visions*
- *Guide to Common Native Trees and Shrubs of Alberta*

FOR1020 Forest Regions of Canada

ACTIVITIES/WORKSHEETS

Assignments:

1. Research and prepare a detailed list of factors that act independently and together to determine the type of forest on a given area. These factors should include information on climate, soil, landforms and topography, and the interactions between the three.

2. Using the Scientific Method develop a hypothesis that tests plant growth rates against moisture availability. Write up the experiment, conduct it and interpret the data collected. Remember to practise safe laboratory habits.

3. Forest Regions of Canada
    - on a large sheet of paper (min. 11x17), pencil in the boundaries of this country. Add the provincial boundaries
    - pencil in the forest regions
    - make sure your map is neat and clearly understandable. It must have a key, scale, north arrow and legend
    - on the next page is a sample sheet you can use to fill in information on each forest region
    - repeat the above list for Alberta and its forest regions.

4. Leaf collection
   Collect and prepared for formal presentation the leaves (twigs if winter) of five grasses (omit in winter), five local shrubs, willow, aspen, balsam poplar, white birch, jack pine, lodgepole pine, white and black spruce, larch and balsam fir. The species list may be altered by your teacher to fit local conditions.

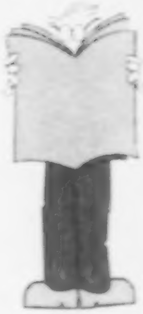
CAREER & TECHNOLOGY STUDIES

FORESTRY

SAMPLE STUDENT LEARNING GUIDE

FOR1040 Woods Survival 1 (Survival Skills)

WHY TAKE THIS MODULE?



- This is a two-part module that will teach you safe and enjoyable skills and attitudes that will aid you in working and/or recreationing in the forest environment.
- This module will introduce you to the physical demands faced by a person travelling in the forest and provide structure and direction to learn from these experiences.
- It is recommended that this module be taken in conjunction with Woodmanship II (FOR203) and that you do this module in the spring (April-May).
- Remember that when in the forest the attitude of minimal impact interaction should direct all your activities.

WHAT DO YOU NEED TO KNOW BEFORE YOU START?

Prerequisite: Emergency First Aid (current certification)

You should also have a desire to experience and interact with a forest environment.

WHAT WILL YOU KNOW AND BE ABLE TO DO WHEN YOU FINISH?

Upon completion of this module you will be able to:

- demonstrate knowledge, skills and attitudes necessary for safe and comfortable outdoor forest experiences
- conduct safe outdoor forest activities that have minimal environmental impact on the forest
- demonstrate basic competencies.

WHEN SHOULD YOUR WORK BE DONE?

Your teacher will give you a timeline for completing tasks and assignments within this module.

You may also wish to use a time-management planning chart to preplan the work that needs to be done in this module. Plan how you will use your class time as well as extra time needed to complete the assignments in this module.

12
1
2
3
4
5
6
7
8
9
10
11

HOW WILL YOUR MARK FOR THIS MODULE BE DETERMINED?

	PERCENTAGE
You must first demonstrate all of the competencies required for this module. When you have done this, your percentage mark for the module will be determined as follows:	
• Hazardous list and test	5%
• Adverse conditions (discussion)	5%
• Shelter construction	20%
• Fire construction	10%
• Pack and walk	30%
• Water management	10%
• Tool use	20%

WHICH RESOURCES MAY YOU USE?

- *The Common Sense and Medical Guide and Outdoor Reference*
- *Wilderness Survival*
- *Wilderness Survival Handbook*
- *Finding Your Way in the Outdoors*
- *Two in One Survival Library*
- *Local Forest Station and its employees*

ACTIVITIES/WORKSHEETS

- Prepare a list of possible hazards you may encounter in the natural environment, and on a test explain in detail several of the hazards.
- Explain why you must always be prepared for adverse conditions in the forest; i.e.:
  - having adequate and sufficient food
  - having adequate and sufficient water
  - adequate and sufficient first-aid equipment.
- Demonstrate the proper construction of a quinze, or lean-to if there isn't enough snow in the area.
- Correctly build, use and contain a small campfire, making sure you address all safety precautions.
- Prepare a list of equipment, food and clothing required for a three-day hiking trip. Assemble the list, load the pack, put it on and walk a minimum of three kilometres without removing the pack.
- Explain and demonstrate proper water management; i.e.:
  - drinking water
  - disposal of waste water
  - proper latrine location.
- Demonstrate the following skills:
  - correct axe and knife carrying
  - correct axe and knife use
  - correct axe and knife maintenance.

CAREER &
TECHNOLOGY
STUDIES

FORESTRY

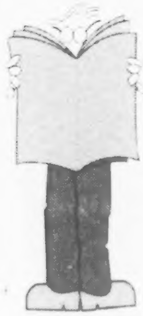
SAMPLE STUDENT LEARNING GUIDE

FOR1090 Forest Ecology 1 (Ecosystem Dynamics)

472

FOR1090 Forest Ecology 1 (Ecosystem Dynamics)

WHY TAKE THIS MODULE?



- Being able to work with living things means you have to understand how things work. The easiest way is to look at the component parts of a system. Therefore, in this module you will look at several parts of the forest. These include tree structure, biotic and abiotic factors of the forest ecosystem, and the role of the tree in the forest.
- Remember you must practise safe work habits in anything you do, especially lab or outdoor activities. If you are not sure how to do something, ask someone having knowledge for instructions first.

WHAT DO YOU NEED TO KNOW BEFORE YOU START?

There are no prerequisites identified for this module.

However, you should understand and be able to apply the scientific method of inquiry.

473

WHAT WILL YOU KNOW AND BE ABLE TO DO WHEN YOU FINISH?

Upon completion of this module you will be able to:

- describe interrelationships among elements in the forest ecosystem
- describe structural units of the tree and their function in performing life processes
- demonstrate basic competencies.

WHEN SHOULD YOUR WORK BE DONE?

Your teacher will give you a timeline for completing tasks and assignments within this module.

You may also wish to use a time-management planning chart to preplan the work that needs to be done in this module. Plan how you will use your class time as well as extra time needed to complete the assignments in this module.

12
1
2
3
4
5
6
7
8
9
10
11

HOW WILL YOUR MARK FOR THIS MODULE BE DETERMINED?

	PERCENTAGE
You must first demonstrate **all** of the competencies required for this module. When you have done this, your percentage mark for the module will be determined as follows:	
• Tree Biology:	
Activity 1.6	10%
Activity 3.2	10%
Tree Drawing	10%
Test	20%
• Forest Ecosystems	
Activity 2.8	10%
Food Web	20%
Test	20%

WHICH RESOURCES MAY YOU USE?

- *Alberta Parks and Recreation: Learning Resources Manual* (Alberta government)
- *Investigating Terrestrial Ecosystems*
- *Field and Laboratory Methods for General Ecology*
- *Managing Your Wood Lot* (Canadian Forest Service)
- *Seeing the Forest Among the Trees*
- *Ecology*
- *Biology*

ACTIVITIES/WORKSHEETS

Section 1: Tree Biology

- Activity 1.6 on page 11 in *Investigating Terrestrial Ecosystems.*
- Activity 3.7 on page 47 in *Investigating Terrestrial Ecosystems.*
- On a large sheet of paper, draw a cross-section of a tree (top to bottom) that shows all components. Label each component. Then, on a separate sheet of paper explain the importance of each structure as well as the processes it carries out. List the percentage by weight and volume that each structure makes up of the tree total; e.g., the leaves make up 1% of the tree's weight and 1.7% of its volume. As well, explain what would happen to the tree if the specific structure had its function impaired or destroyed.
- Completed a written test that will examine you on the structural components of trees, and the function of these components.

Section 2: Forest Ecosystems

- Read chapters 1, 2 and 3 in *Investigating Terrestrial Ecosystems.*
- Activity 2.8 on page 33 of *Investigating Terrestrial Ecosystems.*
- Visit a forested area and prepare a comprehensive food web of the area. Plan this trip with your teacher. Make sure you address all aspects of safety. Plan two trip dates so that if the weather is bad on the first you can go on the second. Once at the area collect data on:
    - types of animals present. Determine numbers and area in which animals are found.
      Look for: scat
      tracks
      bones
      actual sightings
    - types of grass/shrubs/fungi and mosses present.
      Determine numbers and area in which species are found.
    - types and numbers of trees present and area in which trees are found.
    - types and numbers of insects present.
    - soil quality (use a soil test kit).

  Return to classroom with the data. On a large sheet of paper draw a food web using the data you collected. Explain the interrelationships that your food web shows. Prepare it for presentation (make it look good) and hand it in with your field notes.
- Write a test on the material presented in the three chapters and your observations on the field trip.

K. ACKNOWLEDGEMENTS

The Forestry strand was developed through the cooperative effort of people from schools, post-secondary institutions, professional associations, business, industry, labour, and departments and agencies of the Government of Alberta. Alberta Education would like to extend sincere appreciation to the following individuals and groups.

Career and Technology Studies Advisory Committee

Dawn Arnold	Tofield School
Mike Blackwell	Wetaskiwin Composite High School
Susan deWijk	Lester B. Pearson Senior High School, Calgary
Maryanne Doherty-Poirier	University of Alberta, Edmonton
Lynne Duigou	St. Francis of Assisi School, Edmonton
Darwin Eckstrom	Peace Wapiti Regional Division No. 33
Barry Edgar	Grande Prairie Composite High School
Harold Hayter	Northern Alberta Institute of Technology, Edmonton
George Hildebrandt	School System Representative
Gerry Hunt	Eastglen Composite High School, Edmonton
Kenneth Jacknicke	Post-secondary Education Representative
Graham Johnston	Post-secondary Education Representative
Brenda Kent-Packer	Clarence Sansom Junior High School, Calgary
Bev Klemen	W. R. Myers High School, Taber
Kevin Knibbs	Calgary School District No. 19
Arnold Krause	Department of Education, Culture and Employment, Government of North West Territories
Len Luders	Red Deer School District No. 104
Eva-Jane Lundgard	Edwin Parr Composite Community School, Athabasca
Gordon Murray	Bellerose Composite High School, St. Albert
Jeannette Pawliuk	Edmonton School District No. 7
Sam Perverseff	Alberta Teachers' Association Representative
Connie Peters	School System Representative
Darren Reeder	Business/Industry Representative
Rick Roman	Business/Industry Representative
Barry Stangeland	School System Representative
Gordon Welch	CASS Representative
Gordon Worobec	Alberta Teachers' Association Representative

Natural Resource Studies Focus Group

Sherry Dalton	Concordia University College, Edmonton
Gene Dumont	Business/Industry Representative
Dixon Edwards	Alberta Energy & Utilities Board, Edmonton
Ron Erickson	School System Representative
Robert Fessenden	Business/Industry Representative
Peggy Fleet	Alberta Forest Products Association, Edmonton
Dave Fournier	Northern Alberta Institute of Technology, Edmonton
Pat Harris	Ardrossan Junior-Senior High School
Dana Hirst	Business/Industry Representative
Mary Ellen Jones	Jones Group Engineering Ltd., Calgary

Natural Resource Studies Focus Group (continued)

Ann Mallory	Petroleum Resources Communication Foundation, Calgary
Richard Mrazek	University of Lethbridge
Gila Naderi	Petroleum Resources Communication Foundation, Calgary
Susan Nelson	Alberta Office of Renewable Energy Technology, Pincher Creek
Dan Rollert	Business/Industry Representative
Jerry Shimek	Agriculture Canada, Edmonton
David Young	Parkland School Division No. 70, Stony Plain

Development Task Force

Howard Anderson	Forest Technology School (NAIT), Hinton
Jerry Fochler	In Roads Adventures, Stony Plain
Margaret Hee	Government Representative
Doug Krystofiak	Alberta Registered Professional Foresters Association, Edmonton
Mark Ladd	Peace River High School
Ken Scullion	Alberta Vocational College – Lac La Biche

Field Review (1992–1993)

Elvin Blosser	School System Representative
Darlene McDonald	Harry Collinge High School, Hinton
Rob Simpson	Georges P. Vanier School, Donnelly

Field Review (1993–1994)

Ed Hildebrand	Bezanson School
Bruce McGillivray	Ecole J. E. Lapointe School, Beaumont
Derek Schlosser	School System Representative

Assessment Panel (1994–1995)

Howard Anderson	Forest Technology School (NAIT), Hinton
Jerry Fochler	In Roads Adventures, Stony Plain
Mark Ladd	Peace River High School
Bruce McGillvray	J. E. Lapointe School, Beaumont
Derek Schlosser	School System Representative

Assessment Panel (1995–1996)

Howard Anderson	Forest Technology School (NAIT), Hinton
Jerry Fochler	In Roads Adventures, Stony Plain
Mark Ladd	Peace River High School

Assessment Panel (1995–1996) (continued)

Bruce McGillvray	J. E. Lapointe School, Beaumont
Derek Schlosser	School System Representative

Task Force II (1996–1997)

Howard Anderson	Forest Technology School (NAIT), Hinton
Jerry Fochler	In Roads Adventures, Stony Plain
Mark Ladd	Peace River High School
Bruce McGillvray	J. E. Lapointe School, Beaumont
Derek Schlosser	School System Representative
Curtis Tye	School System Representative

Alberta Education, Curriculum Standards Branch

Lloyd Symyrozum	Director, Curriculum Standards Branch (Retired)
A. A. (Scotty) Day	Assistant Director, Curriculum Standards Branch (Retired)
Keith Wagner	Director, Curriculum Standards Branch
Susan Lynch	Assistant Director, Curriculum Standards Branch
Sharon Prather	Program Manager, Career and Technology Studies
Gary Bertrand	Program Consultant, Forestry, Career and Technology Studies

Document publication and administration

Jennifer Annesley
Kim Blevins
Lila Borhot
Lisa Buckland
Lorraine Crawford
Maria Crudo
Christopher Ewanchuk
Nancy Foulds
Lin Hallett
Dianne Hohnstein
Cori May
Joanne Medisky
Pauline Taylor
Catherine White
Marcie Whitecotton-Carroll
Esther Yong